THE BUILDER

A RECORD OF ARCHITECTURE AND CONSTRUCTION.

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HEAT, HEALTH, AND HABIT.

THE word economy is in everyone's mouth at the present time and many, perhaps, are inclined to push it to an extreme limit, among whom some very amusing cases might be quoted. People we have heard of have spent time and trouble in splitting matches with the object of making two or more out of one. The head of a family we know apologised to a guest for the omission of coffee after a dinner of many courses, which he explained was an economy which had been introduced because we were at war. The schemes to save money which correspondents to the daily papers suggest, are too numerous to refer to, and many of them are extremely ingenious and would never have suggested themselves to our more prosaic imagination; but there are certain possible labour-saving devices and big economies which will probably not be adopted for a hundred years, if at all, in this most democratic and, at the same time, conservative land. We will refer to one of these economies, but, lest we be accused of revolutionary tendencies, we may say that our belief in the power of conservatism in this country is so great that we may be allowed to state our views with the same complete certainty that no trouble will ensue which leads the police to allow revolutionists to draw audiences in Hyde Park and Trafalgar-square, while the authorities permit the sale of Mr. H. G. Wells' books, for we propose to lay down some propositions which affect the domestic fireside, that inmost citadel of all which we pride ourselves on. Let us consider a definition of a grate, which might read as follows:—"A grate is an iron basket built into the brickwork of the side of a room for the purpose of warming it. Most of the heat escapes vertically, but the remainder warms the adjacent space in which people are glad to congregate in cold or inclement weather." Our early forefathers lighted a fire in the middle of their huts, and, instead of a half-circle round the fire, obtained a whole circle; but the method was somewhat crude and left little space for a dining-room table, while a priceless oriental carpet would have been decidedly in the way.

Now the human body is only comfortable within a comparatively narrow range of temperature, which may be put at from 55° to 65° Fahrenheit. Above or below these limits we feel disinclined to exert ourselves mentally, as physical conditions become more or less insistent. Obviously, if we are to make the best use of our time, means should be provided to obtain a reasonable temperature in the easiest and simplest manner, and if we are really economists we should try to economise in the fuel necessary to produce the required results. This is effected in public buildings by systems of radiators, or by an application of the plenum system, or by other means of obtaining an equable temperature by the use of a furnace either for heating air by means of water or by heating it directly. It is questionable at what point it would become economical to heat a house by radiators, though gas radiators would make the limit of size a small one, but we have never heard any conclusive reason why the heating system adopted in all parts of America and Canada in small houses is not equally applicable here. We refer to heating air by means of a furnace and delivering the heated air by means of ducts to every room and part of a house. We are told that American houses are unpleasantly overheated, but that is a question of opinion, and also depends on the size of the furnace and the capacity of the ducts connected with it, which can be regulated at will. The defect sometimes alleged, that heated air is made too dry, is also one which can be coped with by mechanical means. The nett asset gained is that only two fires are required in a house, and possibly only one—the furnace itself and the kitchen range, which, in most places, can be replaced by either a gas or electric cooker. Hot water is wanted for washing, but even in the case of a comparatively small house can be better and more conveniently supplied by an independent boiler, and in the case of the system we mention, possibly by the main furnace boiler itself, or at any rate by an adjoining one, which can be stoked at the same time. Stoking once in every 24 hours will suffice for such a system; the closed heating furnace can also be used as a refuse destructor; while practically the whole of the heat produced is utilized and thus economy is effected. We rely, especially in bedrooms, on chimneys for ventilation, but it is well known that if fresh air is introduced into any room, vitiated air will find its way out, so such a system provides for ventilation as effectively or more so than a chimney. Medical men say that sleeping under a great weight of covering is not a good thing, and by the adoption of such a means of heating every part of a house, a bedroom becomes as warm as a sitting-room and lighter covering is required. More than this, there is economy in first cost of construction—the brickwork of chimney-stacks and other items of cost are saved, and in a room 16 by 12 ft. or 192 sq. ft., about 5 ft. by 4 ft., or 20 sq. ft. are wasted, for no furniture can be placed in front of a fire-place—economy in cleaning and time saved in laying and lighting fires, economy in coal and greater immunity from draughts, which are largely caused by inequalities of temperature in adjoining areas.

The disadvantages are, firstly, that the open fireplace is the most cherished of the Englishman's possessions, the historical expression of comfort, and that the fireplace affords an architectural opportunity to the designer, while its external expression, the chimney, is the glory of mediæval architecture which in the modern house we attempt to emulate. Nor must we forget that the efforts of many skilled manufacturers have largely overcome the wastefulness of the open fire, and contrivance and ingenuity will doubtless do more in the future. On the whole we feel inclined to think that these considerations, in addition to the natural dislike to change, will preserve the open fire like the British Constitution and to a distant future era, although the number of convinced believers in scientific methods of heating will tend to continually, but somewhat slowly, increase. Our apology for bringing up the subject is that our contemporaries are all talking about economy, and we do not wish to be out of fashion, while we believe it to be occasionally useful to consider revolutionary ideas if only that they may be rejected with scorn. Apart from this, we take away one of the planks on which advancing woman treads when she assails the fortress of architecture and points out the many defects which will always exist in our houses till woman, armed with a pair of dividers and a scale, reduces the male architect to the position of rubbing up her ink and running on her errands.

NOTES.

The Lights of London.

An evening paper recently suggested that the lighting restrictions in London would shortly be removed, as the authorities had so far improved the aerial defences that the darkness in which we have been groping is no longer necessary. We hope that this is so, for despite the reasons of those who affect to find rest and æsthetic advantages in the darkened streets, they have proved intensely depressing and decidedly dangerous for traffic. The removal of few restrictions will be more welcomed than the abolition of the lighting restrictions, which have, in addition, seemed to be a little humiliating, though undoubtedly necessary. We trust that this year the German aviators may have too much work in guarding their own industrial and military centres to be able to pay us surprise visits, though the destruction of two Zeppelins in every visit to England would perhaps make the game worth the candle from our standpoint.

Parks as Farms.

We appreciate the wish shown to increase the home-grown food supplies of the country, but think that the proposal to utilize public parks is far-fetched, because without acquiring them for such a purpose there is in practically every county of England agricultural land which is by no means put to its fullest use. When the building plot blossoms like the rose and every available acre teems with vegetable produce the time will come, if we are still at war, to think of the parks, but we doubt if it will be necessary. We can imagine many things if we have the gift of fancy, and it may be that circumstances might arise in which a citizen would be heavily fined if he did not utilize every window-sill as a means of increasing production by systems of intensive culture.

The Labour of Writing.

We have sometimes wondered in thinking of economies of time and labour whether it would not be feasible and sensible to abandon the early teaching of writing in favour of shorthand or some abbreviation which would save an immense amount of apparently useless mechanical labour. The teaching of writing, like that of our system of weights and measures, occupies an enormous proportion of our time in school days, and only a comparatively small number of people end by acquiring the art of writing clearly and legibly because the process is fundamentally difficult—far more so than that of acquiring a fair amount of proficiency in drawing. Nor can a good hand be said to be, as drawing can, an end in itself; it is only a means to an end—the conveyance of thought, and if a better and quicker method can be arrived at all would benefit by its adoption. The words of the most rapid speaker can be taken down by a good shorthand writer, a feat impossible by any other method, while we know that the labour and time involved in writing frequently stand in the way of intercourse between people at a distance from one another. The abbreviations employed by our ancestors show that they appreciated the points we have referred to.

Workmen's Compensation, Insurance and Insolvency.

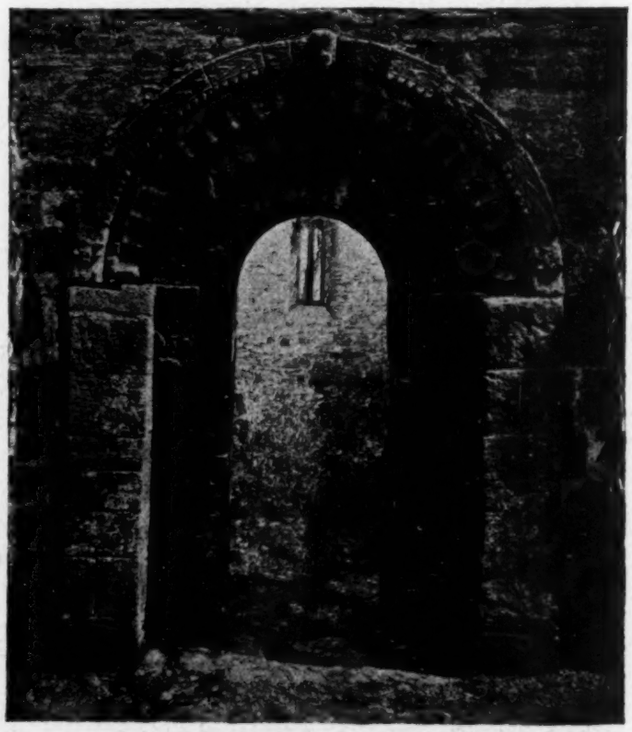
A recent case in connection with Workmen's Compensation (*In re* Renishaw Iron Co., Ltd., *Weekly Notes*, Nov. 25) raises a point which we think calls for remedial legislation. Two workmen in the employ of the Renishaw Iron Co. had, in 1908 and 1909, met with accidents, and the compensation had been agreed at £1 in each case. For a time the Company paid these sums, being recouped by their insurers with whom they had insured themselves against all liability. In December, 1910, the insurance company went into liquidation and was compulsorily wound up. The employers put in proofs which included £600 for their liability to the two workmen, being the estimated amount to settle their claim. This proof was afterwards agreed at £500, and it had not been finally dealt with, but at the hearing of the case it was stated that the insurers would only be able to pay 2s. in the pound. In July, 1915, the employers passed a resolution for a voluntary winding up, and the two workmen claimed to prove in the employers' liquidation for £246 and £417 respectively. The employers would probably pay a much larger dividend than their insurers, but it was held by the Court that the workmen could only prove as against their employers for the balance, if any, of their claims over and above the £500 at which the liability of the insurers had been agreed. The reason for this decision is that Section 5 of the Workmen's Compensation Act provides that if an employer becomes insolvent the rights of the employer against his insurers shall be transferred to and vested in the workman, but this section was passed in the interests of the workman, and the legislature can hardly have intended that it should have the effect that is shown to attach to it in this case. Here the insurance company was insolvent some five years before the liquidation of the employers, and the insurers selected by the employers are able to pay a less dividend than the employers when their firm is wound up, yet by virtue of a section of the Act intended to benefit the workman, these two men are held relegated as to the bulk of their claims to the assets of the insurance company. The Court founded its judgment on the case *In re* Pethick, Dix & Co. (1915, 1 Ch. 26), but in that case the employers went into liquidation *before* the insurance company. The Court said this fact made no difference, but we respectfully submit it makes all the difference. The employer having become insolvent the workman may benefit by a claim over against the insurer, but if the insurer is insolvent whilst the employer remains solvent, why should the workman be relegated to a claim against the insurers whom he never selected? If the decision correctly represents the effect of the Act remedial legislation is required.

The Delivery of Coals.

Among minor labour-saving reforms which might be introduced is a better method of delivering coal in London. The present plan is to make a mess on the pavement and spend a considerable time in clearing it away, adding a delicate sable cloud to adjoining objects in the process. There is no reason why coals should not be shot down a closed funnel into a coal-hole, and why a coal cart should not be made to tilt up to help to empty itself. We should lose less coal, make less dust and save much time, all things which are worth doing. We cannot claim that the present process is even picturesque, and, like spring-cleaning, it is undoubtedly inconvenient. We are afraid that we can't get rid of spring-cleaning until the vacuum cleaner becomes as cheap as an ordinary broom, or until science invents a strong dirt-attracting magnet, but there is no reason why we should blindly cling to inconveniences which we can readily get rid of by a little thought and contrivance.

Sir Hugh Lane's Gift to ——.

We greatly regret the controversy which has arisen in connection with Sir Hugh Lane's collection of French pictures, and though it may be that London has the best legal claim to them we should feel sorry if they were finally obtained for London on a legal point only. Sir Hugh Lane seems, if we may judge by his actions, to have been somewhat erratic and hasty in his judgments, and possibly neither the London nor Dublin authorities were wise in their dealings with him. If we can judge the statements made by writers to the *Observer* the case for London seems to be the stronger of the two, and the pictures would be appreciated by a greater number of people here than in Dublin because of the larger population of the metropolis. But, after all, the question is not whether they should be removed to America, but whether they should be placed in one of two galleries 150 miles apart, and it seems to us that the London authorities might very reasonably forgo their claim. A controversy over the matter seems to us a little small and a little squalid, especially at this juncture.



No. 5.—Early Doorway, Clon Keen Church.
(The Early and Mediæval Architecture of Ireland. See page 41.)

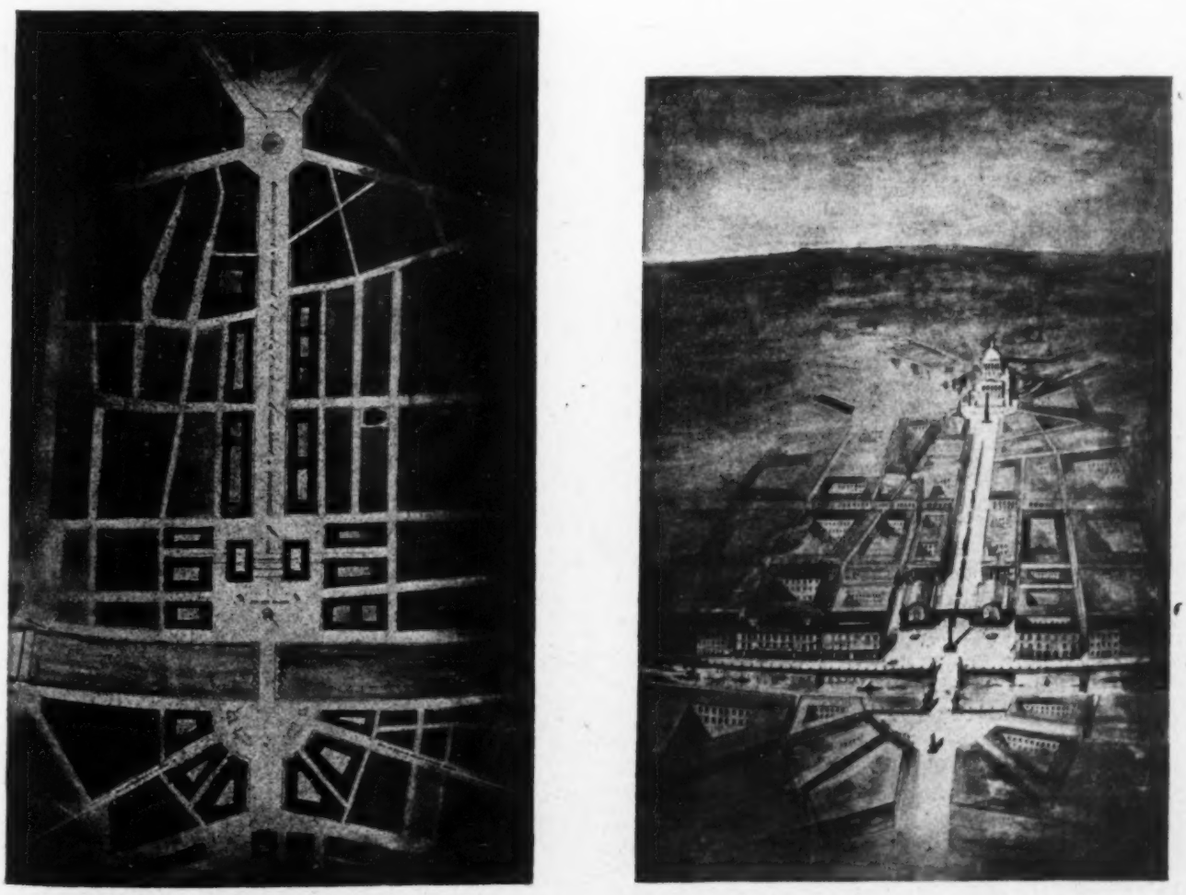
A NEW TOWN PLAN FOR THE CITY OF DUBLIN.

MR. J. W. COCKERILL presided, on Friday last week, at a meeting of the Town Planning Institute, held at the rooms of the Institution of Municipal and County Engineers, 92, Victoria-street, S.W., when papers were submitted by Professor P. Abercrombie, A.R.I.B.A., and Mr. S. A. Kelly, F.S.I., on the town plan for Dublin prepared by the authors, which was awarded the prize offered by the Marquis of Aberdeen to the Municipality of Dublin.

Professor Abercrombie said the plan was based upon three main factors, sociological, geographical, and historical. Other considerations entered naturally into the course of its elaboration, but these three were the determining factors which shaped its physical conformation. The sociological basis took the form of an imperative requirement—the need for some scheme upon which to provide new houses for 60,000 persons who were living in sub-human conditions. The two other factors related to transportation. The geological factor was the conformation of the valley of the Liffey, by which it was evident that a tunnel could be made without excessive cost along the valley to connect Amiens Station with Kingsbridge Station, and a cross connection could be devised to connect Westland-row Station with Amiens Station, or with the east and west tunnel, and join Kingstown with Kerry and the north. The geological factor, then, suggested the feasibility of complete railway unification and a central union station. The historical factor referred to the road system, particularly on the north bank, where the traffic aims of the country roads, making for the one bridge across the Liffey to the walled mediæval town on the south, were sufficiently apparent. A restoration of this natural web provided an objective, at present thwarted, for the radial roads, with a crossing not by the original bridge, as the block of the Four Courts intervened, but immediately to the east, duplicating Richmond Bridge. On the site of the old Ormond Market, then, was the new traffic centre of the city, the road and railway centre coinciding, as they should wherever this was possible. The south bank was less simple to treat, but by the creation of a subsidiary road centre the difficulty had been overcome, and by this arrangement Sackville-street was freed of the incubus of the tram nexus. The silting up of a large part of Dublin Bay had suggested (a) the method upon which dock extension should proceed, (b) two areas of reclamation—the northern industrial and the southern residential, and (c) the utilisation of the North Bull Bank, already naturally reclaimed, for a great sea-fronting park. At the mouth of the harbour a colossal power station was proposed. Dublin presented a most attractive ground for the town planner to work upon—its possession of a series of public buildings of great nobility, whose setting was frequently marred by the juxtaposition of deepest squalor or brutal utilitarianism; its famous Sackville-street, now about to be rebuilt; its fine series of radial roads; its individual wide streets, tenement ridden and isolated from full city life; its north and south circular roads; Phœnix Park, whose wedge shape the most meticulous landscape architect could not improve; and the Liffey, a stream capable of the most beautiful treatment. These and many other fine features were waiting to be worked into a consistent and coherent plan. Professor Abercrombie proceeded to point out how some of the very misfortunes of Dublin in the past now gave it opportunities in the way of town planning denied to other towns. There was a dense population in the centre, but in opening up outside areas there was not a vast accretion of bye-law suburbs to face. There were also a great number of derelict sites about the centre area, which presented an unrivalled opportunity for central improvements. The proposals by his partners and himself had been plotted in three periods, according to their degree of urgency, and modifications could be introduced as the work proceeded without destroying the general conception. It also illustrated how the main objects of the plan could be put into operation at an early stage, so that the commercial improvement might ensue, whilst their final completion would come about naturally as prosperity rose high. If the method of a periodic development was clearly grasped, there was no need to be daunted by the magnitude of the proposals. Enormous results could be obtained if only everything that was done, however small, was part of a thought-out organic scheme.

A paper had also been prepared by Mr. Sydney A. Kelly, who collaborated with Professor Abercrombie in preparing the scheme. The paper dealt more in detail with the proposals of the authors, and these were explained by Professor Abercrombie with the aid of a fine series of lantern slides. The series included the whole of the drawings given in last week's *Builder* illustrating the authors' scheme.

Mr. H. V. Lanchester, F.R.I.B.A., in proposing a vote of thanks to the reader of the paper, said the address was one for considered thought rather than for casual review. They must all appreciate that Professor Abercrombie had set a standard with regard to a comprehensive town plan which had not hitherto been reached in this country. They would all hope that in a large measure, if not in its entirety—



City of Dublin New Town Plan. Centre Portion of Messrs. Bogle, Burroughs, Panton & Newbold's Scheme.

[We gave this last week on the same sheet as one of the plans of the selected design without a separate heading, and we therefore repeat the illustrations this week.]

which was almost too much to hope for—the scheme would be carried out.

Mr. Lichfield seconded the motion.

Professor S. D. Adshead said that the point emphasised as to developing the scheme in stages was important in regard to all town-planning schemes. A town-planning scheme of this magnitude must be considered as an organic growth. The thing was not so much to prepare complete detailed plans, as in the case of a building, but to organise, as it were, each section in stages. Professor Abercrombie had shown them that he had considered the problem in that light, and it was a very vital point indeed. It was a point neglected in many town-planning schemes, although not so much in this country, and it made such schemes less practical in appearance, and, he thought, probably they would be found less practical in the carrying out.

Mr. Ashbee, as one of the competitors, congratulated Professor Abercrombie on his paper. He hoped he was not pessimistic, but when in Dublin, he heard a good deal of what people said, and one city magnate said that if the drawings were done by an archangel from Heaven they would never be carried out. The difficulty was political and social. The voters in the tenement houses were controlled by members of the Corporation, and unless some great political change took place, he did not see what was going to make them let go of these people, so that they could be carried out to the surrounding districts. The real object of the competition was to stir up the consciences of the Corporation and the citizens. He suggested that the Institute might try and make some arrangement by which the work of the starred men in the competition might not be thrown away, for if the reports could be printed, a great step would be taken towards stirring the public conscience.

Mr. Lancashire expressed the opinion that such a scheme must be dealt with as a national problem.

Mr. Mawson considered the whole of the competitors were wise in dealing with the Dublin problem in a wide and comprehensive manner. When Professor Geddes and he proposed a scheme for Dunfermline, estimated to cost £1,000,000, they were told it was ridiculous, but they pointed out that it meant spending £20,000 for fifty years, and that what they had done was to put down a policy for the town to live up to. By dealing with a scheme in periods, that which at first sight might appear impracticable could easily be carried out.

Mr. Abbott (Ruislip—Northwood) said the conclusion he had come to from listening to the discussions at the meetings was that the first thing to do was to get a bold scheme, and then the details could be left until afterwards.

Professor Abercrombie, in reply, said he thought it would be a great mistake if the whole of the reports of the competitors were not published.

OBITUARY.

Second-Lieutenant C. W. H. Foord.

Second-Lieutenant C. W. Hougham Foord, of the Queen's Regiment, who died of wounds on December 19, aged 31 years, was the only son of Mr. A. Stanley Foord, of Wimbledon. He was educated at Dulwich College, and then—having served his apprenticeship to Messrs. Gwynne, of Hammersmith, engineers—entered the firm of Messrs. Marks & Clerk, of Chancery-lane, W.C., consulting engineers and patent agents. He was elected a Fellow of the Royal Society of Arts in 1911, and of the Chartered Institute of Patent Agents in 1913. He enlisted in the R.N. Anti-Aircraft Corps in June, 1915; he soon obtained a commission in the Buffs, and upon transfer to the Queen's went to the Front in November with the Machine Gun Corps.

Mr. E. M. Thomas.

The death, on December 27, at Madras, is announced of Mr. Ernest Montague Thomas, F.R.I.B.A., who was consulting architect to the Government of Madras, youngest son of the late Edward Thomas and brother of Sir A. Brumwell Thomas, of London, architect.

THE CONCRETE INSTITUTE.

PILE-DRIVING AND THE SUPPORTING POWER OF PILES.

AT a recent meeting of the Concrete Institute Mr. Henry Adams, M.Inst.C.E. (Past President), read a Paper on "Pile-driving and the Supporting Power of Piles." In the course of his remarks he said:—

Twenty-five years ago the author read a paper before the Society of Architects upon "Timber Piling in Foundations and other Works." The notes then collected and since added to relate chiefly to timber piles, with which the author has had considerable experience, and upon which much scattered information has already been published; but all driven piles, whatever the material, must behave more or less according to the same laws, and the knowledge gained concerning ordinary timber piles will be likely to enable us to discover the laws and regulate the practice of driving and using piles of other material, including reinforced concrete.

Different writers give different formulæ, using the same letters for different purposes, and sometimes omitting to state either what the letters stand for or what units are to be adopted.

In order that the formulæ here given may be easily compared, advantage has been taken of the Standard Mnemonic Notation issued by the Concrete Institute. This notation can be used with any system of units.

By converting the different formulæ into Standard Notation it is made abundantly clear that many formulæ which were formerly considered as divergent are really identical in every particular except notation.

The chaos which has crept into notation is very well exemplified by the curious association of symbols in the Dutch and French formula as quoted by Molesworth.

For example, Molesworth states—

$$L = \frac{W^2 h}{k\, e\, (W + M)}.$$

In this equation

L is the curtailment of the English term "*Load*."

W is the curtailment of the English term "*Weight* of the ram."

h is the curtailment of the English term "*height*," also the French "*hauteur*."

k is the English equivalent of the Continental and Greek "kappa"—an international symbol for a *constant*.

e is the curtailment of the French phrase "*enfoncement final du pieu*," or final set of the pile.

M appears to be arbitrary.

Sometimes M is used for the term "*poids du mouton*," or weight of the ram; but in this case M represents "*poids du pieu*," or weight of the pile.

Thus in one simple formula the symbols L and W are translated into English from the French,

h is the same in English and French,

e is left in the original French,

k is international and common to the chief European languages

M is arbitrary and does *not* mean "*poids du mouton*."

In English abbreviations this formula would be—

$$R = \frac{W^2}{C\,(W + W_p)} \cdot \frac{h}{s},$$

where R = Safe *Resistance* of the ground to further penetration by the pile in tons,

C = a *Constant* = 10 for rams lifted by hand, steam or other power winches,

W = *Weight* of the ram in tons,

W_p = Weight of the pile in tons,

h = height of fall in inches,

s = set of pile under the last blow of the ram in inches.

It will be seen that quantities of a like nature such as R, W, and W_p and also h and s, have been grouped together. Since C represents a pure number, it is clear that R will be in the same units as W.

In French abbreviations the formula would be—

$$R = \frac{P^2}{C\,(P + P_p)} \cdot \frac{h}{e},$$

where R = *Resistance* du pieu en kilogrammes,

P = *Poids* du mouton en kilogrammes,

P_p = *Poids* du *pieu* en kilogrammes,

C = Un *Constant*,

h = *hauteur* de chute du mouton en centimetres,

e = *enfoncement* final du pieu sous un coup de mouton en centimetres.

The Standard Mnemonic Notation issued by the Concrete Institute, so far as relates to the present subject, is as follows:—

ABBREVIATIONS.

A = cross-sectional *Area* of the pile.

C = a *Constant*.

d = *diameter* of the pile.

E = *Elastic* modulus of the pile.

F = total *Friction* between the pile and the earth.

f = intensity of *frictional* stress = F/S.

Φ = greater *phi* = *friction* modulus.

θ = *theta* = angle of repose of earth.

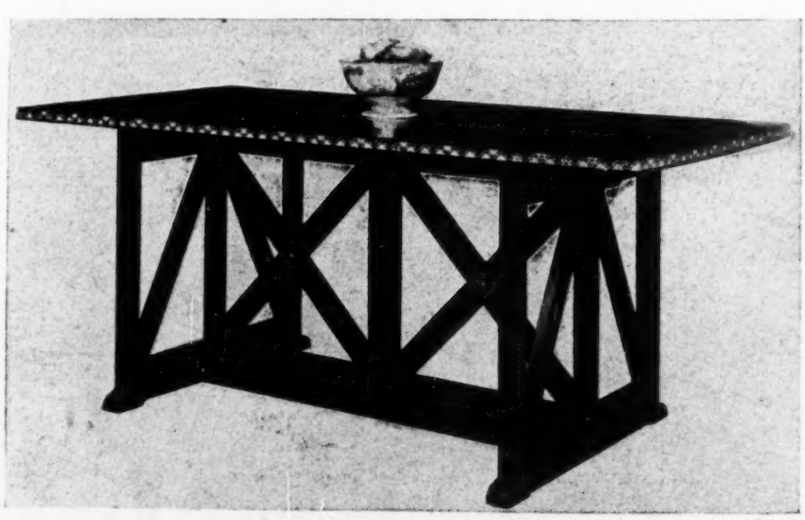


Table by Mr. Ambrose Heal. From the Arts and Crafts Exhibition.

We illustrate two pleasing examples of simple furniture design exhibited at the Arts and Crafts Exhibition, and made from designs of Mr. Ambrose Heal. The table is painted black and decorated with bright colours; while the oak sideboard is ebonised and gilt.

g = *gravitational* acceleration = 32.2ft./sec.^{2}.

h = *height* of fall of ram (h is the general symbol for height whatever the unit).

H = *Height* of fall in feet (this symbol is only used for equations employing mixed units of feet and inches), H = H_f ft.

H_f = the numeric of H = the number of feet in the height of fall.

$$H_f = \frac{H}{1\text{ ft.}}$$

l = *length* of pile below the ground.

l_a = *length* of pile *above* the ground.

$L = l + l_a$.

$$M = \textit{Momentum} = \frac{W}{g} v = m v.$$

$$m = \textit{mass} = \text{inertia} = \frac{W}{g}.$$

P = total estimated *Pressure* on the pile.

(general) p = intensity of *pressure*.

(special) p = intensity of bearing *pressure* when so specified in the context.

Q = a *Qualifier* (*i.e.*, a coefficient).

q = a *qualifier* (*i.e.*, a coefficient.

R = working statical *Resistance* of the earth to further penetration of the pile.

r = a *ratio* as defined by the context.

S = *Superfices* of a *pile* = the *surface* in frictional contact with the earth (*i.e.*, in the case of a square pile S = 4 d l).

s = average *set* of the pile under the last few blows = s_f in.

s_f = the numeric of s = the number of inches in the *set* of the pile $\left(s_f = \frac{s}{1\text{ in.}}\right)$.

U = *Ultimate* statical resistance of the earth to further penetration of the pile.

W = *Weight* of the ram.

W_p = *Weight* of the *pile*.

Note as to Units.

Unless otherwise specified—

(1) d, b, l, l_a, and s are in like units of length.

(2) A and S are in like units of area—(units of length^2).

(3) F, P, R, U, W, and W_p are in like units of force.

(4) E, f, p, F/S, and R/A are in like units of intensity of force = units of force divided by units of area.

(5) C, Φ, Q, q, and r are pure numbers or pure ratios between like magnitudes.

H_f is a *number* of feet in the height of the fall of the ram.

s_f is a number of inches in the *set* of the pile.

The last two symbols only occur in formulæ involving the use of mixed units of feet and inches.

As the mnemonic abbreviations represent real magnitudes irrespective of the unit of measurement, the sizes of the units selected in each case have been placed against the particular formula and not against the general list of abbreviations, which are applicable to any or all units, whether Metric or British, and whether tons or pounds, feet or inches.

Driving Piles.

The smallest piles are driven by a "beetle," which is a heavy long-handled wooden mallet, weighing about half a hundredweight. For driving larger piles up to 10 in. square, an apparatus called a ringing engine is used. It consists of a light framework with a pulley at the top and a rope over it, connected at one end to a ram weighing from 3 to 5 cwt., and at the other end attached to four or more short ropes or tails for pulling by hand-power directly applied. One man is allowed to each 40 lb. weight of ram, and two can hold on to one tail. By this means a rapid succession of blows is given with a light fall. The ram is in some districts called a tup, or trip, and in London is very often called a monkey, but the monkey is properly only the slip-hook that runs up and down to lift and drop the ram in the larger apparatus.

Ordinary piles are driven by what is called a "pile engine." It is virtually a large hammer the weight being arranged to fall freely and strike a succession of blows upon the head of the pile. It consists of a tall framework, with vertical guides on the face to keep the hammer or ram in a direct line with the head of the pile. The base of the pile engine is placed just above the finished level of the pile head, so that in driving long piles a high framework is required. It is, however, sometimes impossible to get the framework high enough for this, and it is then set 6 or 8 ft. above the finished level, and a punch, dolly, or follower, of hard wood, hooped at both ends, is used on the head of the pile when it gets as low as the base of the frame, but the blow is not so effective and the method should be avoided when possible; it is said to reduce the effect of the blow one-third, more or less, according to the rigidity of the material.

Pitching and Driving.

In pitching a pile care must be taken that it is started in the right place, as it cannot be shifted, but if the point is not truly in line with the axis of the pile, or gets pushed to one side by meeting an obstruction before it has entered very far, the lower end of the pile will be drawn over to the side to which the point leans. In spite of the greatest care they will sometimes be found slightly out of position, and they have then to be drawn back into place by chains, twisted like a surgeon's tourniquet, while being bolted to the other timbers. If it be necessary for them to be scarfed, the upper portion can be adjusted by cutting the scarf a little out of line to suit. All piles are not required to be vertical; in building jetties the outside row of piles is often doubled, the outer pile being a raking one, at 15 to 30 degrees from the vertical, for increasing the stability, acting like a buttress. At the corners of jetties the outer piles are usually raking both ways, say about 15 degrees from the vertical. When necessity arises piles may be drawn from the bed of a tidal river by lashing empty barges to them and letting them lift by the tide. Against a river wall or round the foundations of a bridge piles should be sawn off by a diver as low as he can get at them in preference to drawing them, to avoid any risk of scour and undermining of the foundations taking place. On land a pile may be drawn by lashing a short piece to the top and then prizing it up by another baulk used as a lever, or by a pair of powerful jacks.

Reinforced Concrete Piles.

The advantages of reinforced concrete piles are so manifest that they need no express recommendation here. The chief physical differences from timber piles, as regards driving and their supporting power, are due to their extra weight and their friable nature. They should be made with slow-setting cement six weeks before driving, but if made with quick-setting cement they must be left eight weeks, because in the latter case the outside hardens first and leaves the interior soft. They should be driven by steam or drop hammer with a 3-ton ram, having a fall of 3 ft., with a steel helmet filled with sawdust, and preferably without a dolly.

In America the use of a water jet is found to greatly facilitate the sinking of concrete piles.

Hollow cylindrical reinforced concrete piles have been used at Southampton, Newcastle-on-Tyne, and Liverpool. They are lighter and cheaper than solid piles and more effective. Those at Brocklebank Dock, Liverpool, were 20 in. diameter. Reinforced concrete piles of circular section are easier to drive than square piles, and as they have no sharp angles are less liable to be damaged by coming into contact with boulders, &c.

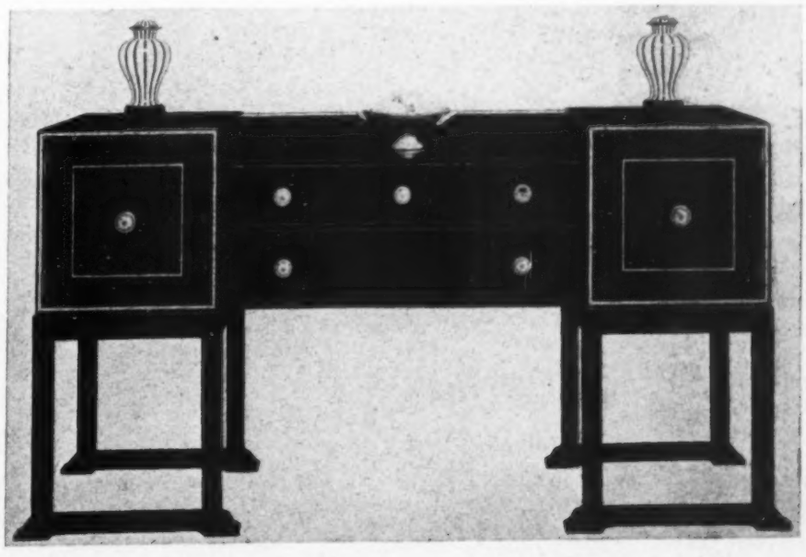
As reinforced concrete piles are made horizontally, care must be taken in lifting them; the points of attachment for lifting should not be less than half the length apart, and if lifted with one end on the ground, the attachment should be one-third the length from the other end.

The reinforcement rods (about 2½ per cent.) should preferably be hooked at the top and electrically welded together at the bottom They should be bound helically by, say, ¼-in. wire, 4-in. pitch, carefully secured at the top.

New Calendars.

Messrs. Ashwell & Nesbit, Ltd., Barkby-lane, Leicester, have sent us one of their very useful almanacks for 1917. It consists of a large, loose-leaf calendar mounted on a stout board, above which is given an excellent illustration of the offices of the British-American Tobacco Co., Ltd., Millwall. The heating and ventilation of this building was carried out by the above-mentioned firm. On the back of the almanack is reproduced a view of the company's works.

We have received from Messrs. F. Troy & Co., Builders, Decorators, &c., 194 and 196, Finchley-road, N.W., one of their almanacks for the current year, which is a neat and admirable production. It consists of an excellent reproduction in colours of a work entitled "When shadows veil the meadows," and a loose-leaf monthly calendar.



Cabinet, by Mr. Ambrose Heal. From the Arts and Crafts Exhibition.

GENERAL NEWS.

Professional Announcements.

During the absence of all the partners of the firm of Messrs. Pine-Coffin, Imre, and Angell, who are serving with H.M. Forces, Mr. Charles J. Ford has kindly consented to attend to their business at 4, Mitre-court, Fleet-street.

Mr. George Hubbard, F.R.I.B.A., of 112, Fenchurch-street, E.C., has, as from January 1, taken his son, Mr. Philip Waddington Hubbard, B.A.Cantab., into partnership, together with his assistant, Mr. William Charles Symes, P.A.S.I., who has been with him for over twenty years. The style of the firm will be known in the future as "George Hubbard & Son."

Pioneer of Daylight Saving.

The Colchester Town Council have resolved to erect a statue to Mr. William Willett, the originator of daylight saving and a native of Colchester.

Broadstairs Cliff Fall.

The western promenade of Broadstairs for a length of 70 ft. has disappeared into the sea. The landslide is the heaviest known in the district for many years, and over 700 tons of chalk and earth are now lying on the sands 65 ft. below the cliff top.

Sir W. B. Richmond.

Sir William Blake Richmond has written a very interesting novel, "The Silver Chain," which Messrs. Cecil Palmer & Hayward have almost ready for publication. The pen-pictures he draws of Italy and Sicily are, we are informed, really memorable.

N.S.W. Chair of Architecture.

It is stated that the New South Wales Government has endowed a Chair of Architecture, at the Sydney University, for £2,000 annually. It is claimed that this is the first occasion that a Government of the British Empire has recognised the national importance of architecture.

Projected Improvements, Blackpool.

The Corporation is promoting a bill in Parliament to provide for the inclusion within the borough of the urban district of Bispham, for an extension of the promenade which will nearly double its length, for the making of new streets and the improvement of old ones, and for the construction on the foreshore of two open-air sea-water baths. The extension of the promenade on the South Shore will carry it to the borough boundary opposite Squire's-gate.

Practical Books.

The Trade Papers Publishing Co., Ltd., 365, Birkbeck Bank Chambers, High Holborn, W.C., have sent us a catalogue of practical books which they have just published. The list contains many works for the painter, decorator, manufacturer, &c.

New Houses Built in Manchester Last Year.

The number of new dwelling-houses in Manchester certified as fit for human habitation in the year ending October, 1916, is the lowest on record. It amounts to 119, as against 410 in 1915, 782 in 1914, 583 in 1913, 615 in 1912, 964 1911, 1,590 in 1910, and 2,344 in 1909. In the ten preceding years the average was over 2,000. In eleven districts of the city no new houses were built at all.

A New Calendar.

We have received from Messrs. Hibberd Bros., Ltd., joinery manufacturers, 146, Vauxhall-walk, S.E., a very neat loose-leaf calendar for 1917, with an excellent reproduction by colour photography of the water-colour by George Howell Gay, entitled "In the Heart of the Woodland." It is published by the Thos. D. Murphy Co., Red Oak, Iowa, U.S.A.

Glasgow Cross Reconstruction Scheme.

Plans for the reconstruction of their premises at Glasgow Cross in accordance with the Corporation scheme of improving that locality were before the Drapery and Furnishing Warehouse at their quarterly meeting recently. The plans approved by the "D" and "F" Stores allow for the setting back of the new building in the Gallowgate about 4 ft. from the present building line, and about 2 ft. in the High-street, with a large circle at the junction of the two walls. The plans were prepared by Messrs. Bruce & Hay, architects, Glasgow.

Fitzwilliam Museum, Cambridge.

Mr. W. B. Redfern has presented to the Fitzwilliam Museum a collection of thirty-seven highly-interesting drawings of the old collegiate and other buildings in the town which for the greater part have lately been much altered or quite destroyed. The museum authorities have also acquired, by gift, the autograph ledgers in which Sir Joshua Raynolds recorded the names, with dates, &c., of his sitters in an interval of more than thirty years, with the prices he was paid for their portraits, and a large number of sketch-books, note-books and lectures by John Flaxman, R.A., together with a volume of portraits of Blake, Fusch and other artists, his friends and contemporaries.

The Carpenters' Company.

A course of lectures will be given on Wednesday evenings at the Carpenters' Hall, London Wall, E.C., at 7.15 p.m., as follows:—

January 31—Mr. Thackeray Turner, F.S.A., F.R.I.B.A., "What I Have Learnt from the Care of Ancient Buildings"; February 7—Mr. Joseph Pennell, "Wonder of Work in War Time"; February 14—Professor Sir Frederick Bridge, C.V.O., Mus. Doc., "Samuel Pepys, Secretary of the Navy: A Lover of Music" (musical illustrations); February 21—Mr. Lawrence Weaver, F.S.A., "Scottish Houses of Five Centuries"; February 28—Mr. M. H. Baillie Scott, "An Old Kentish House"; March 7—Mr. George Clausen, R.A., "Tradition of Mural Painting"; March 14—Mr. Charles Aitken, "Some Recent Additions to the National Collections"; March 21—Mr. Herbert W. Wills, F.R.I.B.A., "Character in Building"; March 28—Mr. C. Lewis Hind, "Building and Furnishing a House—the Right Way and the Wrong Way"; April 4—Professor Wm. Somerville, D.Sc., M.A., F.L.S., "British Forestry—Past and Future."

National Gallery Bill

At a meeting held at the Royal Academy, attended by numerous representatives of about twenty of the principal artistic societies in the United Kingdom, it was resolved that, considering the admiration and reverence in which the National Gallery is held by all artists as the most completely representative gallery in Europe of the works of the great masters of painting, an address be forwarded to the First Lord of the Treasury protesting against the Bill giving powers to the Trustees of the National Gallery to sell works of art from the national collection. An address prepared by the Council of the Royal Academy and laid before the meeting by Sir Edward J. Poynter, the President, was approved and signed by all those who were present.

City of New York Water Supply.

Delivering his presidential address to the members of the Institution of Sanitary Engineers in the Caxton Hall on Wednesday last week, Mr. W. J. E. Binnie described some of the most important works of sanitary engineering in ancient and modern times. Turning to the greatest work of modern sanitary engineering, the water supply of the city of New York from the Catskill mountains, Mr. Binnie gave an account of the magnitude of the preliminary work, especially as regards the crossing of the River Hudson, the method finally adopted being a pressure tunnel deep in sound rock at a level of 1,100 ft. below the surface. The scheme was estimated to yield 660,000,000 gallons per day, or, with existing sources of supply, 900,000,000 gallons. The population of Greater New York was about the same as that of Greater London, but New York required 100 gallons per head of the population daily, whereas London was content to put up with less than forty. Consequently, the total quantity supplied to London was only about 250,000,000 per day.

Cardiff Conference and Housing in Wales.

Mr. D. Lleufer Thomas presided at a meeting of the Welsh Housing and Development Association held at Cardiff recently. The draft of a memorandum on after-war housing policy to be submitted to the Cabinet Reconstruction Committee was approved. Among other recommendations the most important was that a sum of not less than £5,000,000 should be allocated by the Government for expenditure in the Principality after the war on road construction and housing. It was decided to co-operate with the National Housing and Town-planning Council in convening a conference of South Wales representatives of local authorities at Cardiff in February, and a conference of Trade Unions in March for the purpose of considering town-planning and housing problems in relation to social reconstruction. On the Chairman's suggestion, it was resolved to suggest to the board of management of King Edward VII's Hospital that future extensions of that institution should be carried out on one of the elevated regions in the suburban areas of Cardiff rather than in such a confined district as that of Newport-road.

Birmingham Builders' Association.

At the annual meeting of the Birmingham Building Trades Employers' Association, Mr. Arthur J. Bowen was re-elected President; Mr. E. Teall and Mr. S. G. Sapcote, Senior and Junior Vice-Presidents respectively; Mr. W. Harvey Gibbs, Honorary Treasurer; and Mr. C. L. James, Auditor. The report of the Executive Council for the year ended September 30 stated that, as in the case of last year, the conditions had been abnormal in the building trade as in most other trades. There had, of course, been considerable activity on the part of firms engaged in the erection of new factories or workshops, or in the extension of factories or workshops engaged in the production of munitions of war; but the dearth of private buildings, together with the restrictions imposed by the Ministry of Munitions on the carrying out of private building work, had undoubtedly counterbalanced this activity to a certain extent. The Council, however, confidently renewed their hope that after the war there would be developments of material advantage to the building trade.

"A Thousand and One Uses for Gas."

The current issue of *A Thousand and One Uses for Gas*, the monthly publication issued to the business world by the British Commercial Gas Association of 47, Victoria-street, Westminster, S.W., is the third number in a series dealing with the problems attaching to factory-lighting in all its phases. The present issue chiefly discusses the prevention of glare by the use of properly shaded and distributed incandescent gas lights, and it is pointed out that the Home Office Committee on Factory and Workshop Lighting made special mention of high-pressure gas systems as a means of protection from glare, which they consider one of the defects in illumination most detrimental to the health and efficiency of the worker, and, therefore, to the rate and quality of output. Some excellent and convincing photographs illustrate the issue, which concludes by demonstrating the necessity for legally standardising industrial illumination in this country, especially in view of Trans-Atlantic competition after the war, America being well to the front in her treatment of this vital matter.

Book Received.

PAPERS OF THE BRITISH SCHOOL AT ROME. Vol. VIII. (London: Macmillan & Co., Ltd. 21s. net.)

CORRESPONDENCE.

Eclipse or Empire.

To the Editor of THE BUILDER.

SIR,—I have read with very great interest your article under the title, "Eclipse or Empire," in your first issue of this year. I fully endorse the statements and comparison set out respecting the very important question of production and output in the industries of this country with that of America, and while you appear not to have statistical information to hand respecting the building trade proper, I feel of a certainty that very similar results obtain in this particular, knowing that for the last 40 years or more the output of labour in the U.K. has gradually decreased with every advance of wages conceded.

The comparison in the method and facilities more particularly to improved machinery and power, is also highly interesting, in giving parallel reasons why production on the lines quoted should, without injury to labour, be a matter of considerable importance for both capital and labour to consider without delay.

Your article, full of indisputable facts, clearly demonstrates the necessity for a full enquiry to be made, especially into the matter so far as the building trade is concerned. I, therefore, appreciate and welcome the suggestion which you have put forward in this direction as an augury to remedial measures in the direction indicated, which should also be followed up by the organisations of employers, and of the operatives, in solemn conclave, with a determination towards building up an Empire, which, indeed shall never be eclipsed.

W. THOMAS.

Factory and Commercial Property Sales, 1916.

SIR,—On the year under review, we are pleased to report that the sales and letting of factory property, wharves, land, &c., show far better results than was the case in 1915. This result is in a large measure due to the war, which has produced a great demand for factories and commercial property of all descriptions.

We anticipated in the early stages of the conflict a demand would be created for factories, due primarily to the requirements of the Government for the manufacture of the necessary war equipment for our fighting forces; and, secondly, for the manufacture in this country of goods previously imported. This forecast has been realised and the nation's immediate wants have necessarily demanded extra pressure of manufacture, which created a necessity for the opening up of factories as well as the extension of present ones, to cope with the enormous requirements of the country.

We are able to report that we have disposed of a large number of factories with and without plant, and machinery at figures running into many thousands of pounds, and that an unprecedented demand still exists for properties of all kinds. Premises that previous to the war had failed to find tenants for years have been rapidly taken up—owners in many cases having obtained, through competition, increased prices to those asked.

It is interesting to record on analysing the demand for factories that many have been disposed of to the Government; Government contractors in all branches of manufacture; English firms starting to manufacture goods previously imported (now barred through the war); and Belgian manufacturers who largely exported goods to this country, but are prevented from doing so now, owing to their works having been destroyed by the Germans.

To say the Industrial world of England is busy is to use a mild term; it is in the throes of a boom, and, so far as one can judge, is likely to be for some years to come. The Declaration of Peace should mean the opening up by our manufacturers of an enormous over-seas trade, both with our Colonies, new possessions and the world's markets in general; and then will come the time for us to "capture the trade" hitherto to a large extent held by the Germans.

We can safely say the outlook for further deals in factory property is good, and think we are justified in hoping to report a continuance of the demand and supply of commercial properties of all descriptions in the present year, not only for the purposes of occupation by manufacturers, but as investment by trustees, investors and others seeking a good sound improving security.

LEOPOLD FARMER & SONS.

Removing Salt from Sea-sand, Shingle, and Gravel.

To the Editor of THE BUILDER.

SIR,—Many people wonder if salt can be removed from sea-sand, shingle, and gravel. The salt can be removed without a lot of trouble and expense, and at these times will be found very useful for many purposes. Now is a good time to prepare the sand, gravel, &c. I will help any reader to clean the sand, gravel, &c., if they write me.

EDWIN HAMMOND.

32, *Lascelles-road*,
Leytonstone, N.E.

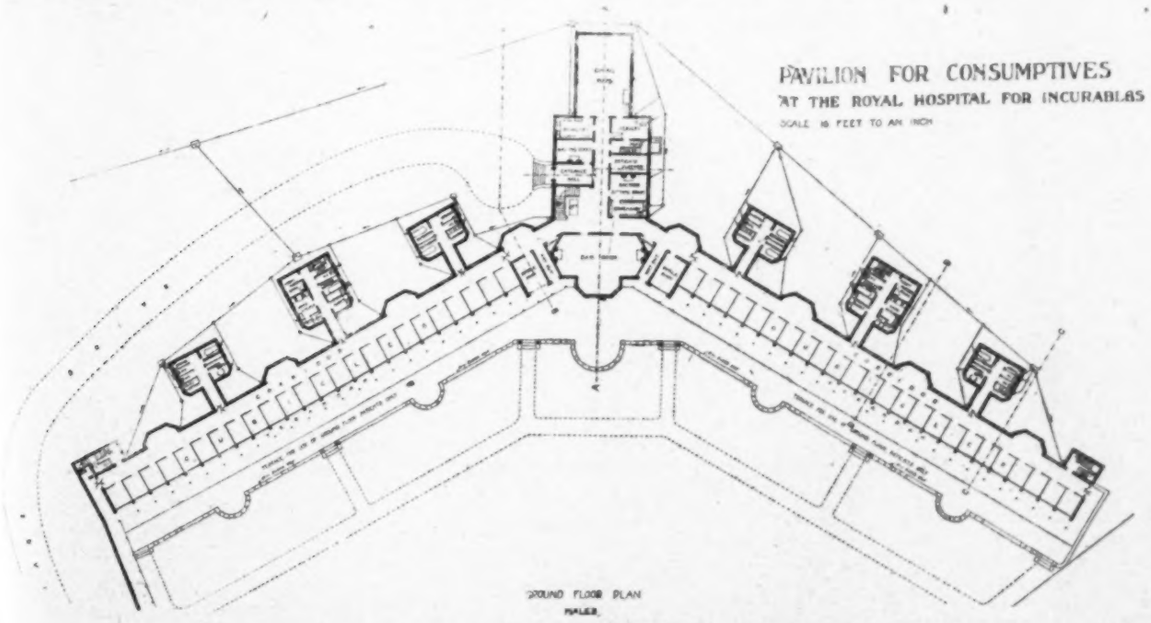
*** If our correspondent has been able to invent a process by which sea-sand can be thoroughly and inexpensively freed from all salt, he has certainly arrived at a discovery of the greatest value to the building trade. We have always considered the problem as insoluble on a commercial basis.—ED.]

The Brucciani Collection

For a century artists and curators of museums have been familiar with the business of Messrs. D. Brucciani & Co., who have maintained a unique collection of plaster moulds and casts from the finest examples of sculpture in the world. Owing to reasons arising from the war this well-known firm found that they could not continue to carry on the undertaking unaided, and that unless assistance were forthcoming, the collection would have to be disposed of, and so, possibly, lost to the nation. A petition headed by Sir Edward J. Poynter, Bt., president of the Royal Academy of Arts, was addressed to the Prime Minister in the hope that the Government might see its way to purchase the collection and place it under State control. The petition, which had very influential supporters, was, unfortunately, not successful. Now it is announced by the Royal Academy that, thanks to the generosity of Mr. William Petersen, the well-known shipowner, who has kindly supplied the means of carrying on the business during the war, arrangements have been made whereby not only will the collection be preserved in its entirety, but under the supervision of representatives of the Royal Academy a regular supply of casts will, it is hoped, be available for the requirements of art schools and museums throughout the country. It is further hoped that after the war, should no assistance be obtained from the Government, a fund may be raised in order that the collection may be purchased and placed under the permanent control of the Royal Academy, thus ensuring its preservation for the nation.

Universities and Art.

In his presidential address to the annual conference of the National Society of Art Masters at Nottingham, Mr. W. H. Milnes, Headmaster of the Municipal School of Art, Coventry, said that the Universities were the cause of the neglect of art education. It was time to find out, he said, how art education could help the manufacturer. Art must stamp the products of machinery with beauty of form and design. It was regrettable, in view of the trade struggle after the war, that there should be an influential desire to decrease art schools, for applied art often determined the market value of the manufactured article.



MESSRS. KAYE-PARRY AND ROSS, Architects. (See page 40.)

Leading Contents.

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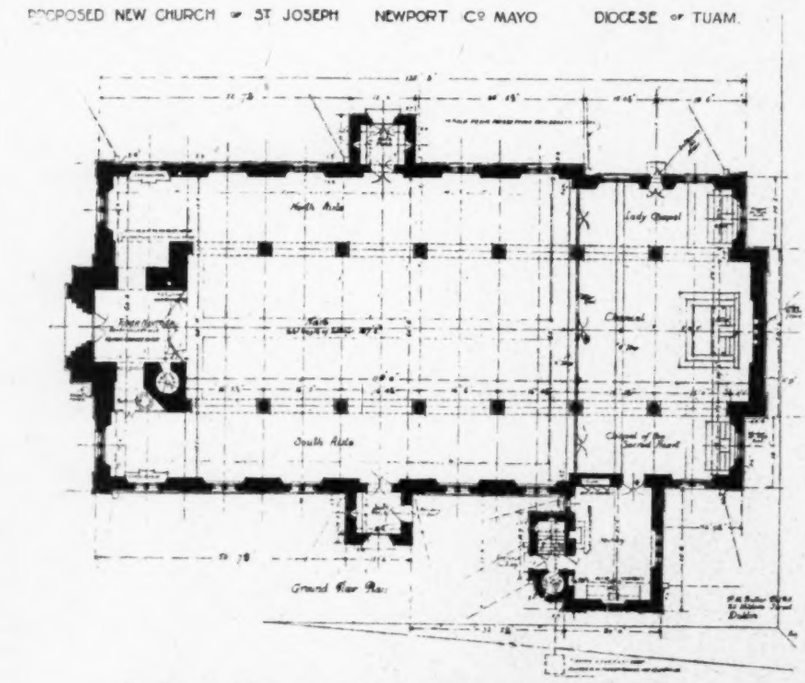
ILLUSTRATIONS.

St. Joseph, Newport, co. Mayo.

THIS church is an application of the type of design characterizing the buildings of the earlier churches in Ireland—and is, for that reason, specially interesting to us. Mr. Butler has applied—we believe for the first time—the theories of Professor Goodyear in modern building. The dimensions of the bays of the nave arcade are very slightly varied in width; the floor is not quite level; and throughout the scheme small irregularities of setting out, such as Professor Goodyear claims are intentional and not accidental, have been introduced into the design. Whether the effect of these will be to give the church some of the charm which distinguishes old work, and which we have been accustomed to attribute almost, if not entirely, to the action of time, remains to be demonstrated by fact. Should this not be the case the building cannot have lost in the process, as the divergencies from symmetrical setting out are very small, and so the experiment is a perfectly safe one. We have a suspicion that the Professor has pushed his theories too far, and think that in all probability the correction of optical errors, such as is given by the entasis of a column or that of the sides of a spire, or the curvature of a flight of wide steps, is all that was usually attempted, though there is no doubt that the Greeks carried the correction of optical defects somewhat further. There is no doubt on the other hand hat our designers are too much obsessed by a desire to obtain absolute symmetry which can only be appreciated on paper.



St. Joseph, Newport, co. Mayo. Mr. R. M. BUTLER, Architect.

Dublin Town Plan Selected Design.

We give an excellent plan, specially prepared by the selected competitors, which shows their admirable scheme more clearly than the smaller reproductions from the competitive drawings which we were able to give in our last week's issue. In this scheme every practical consideration, such as geological formation, which would render the new railway connections feasible or otherwise, questions of traffic, and the possibility of carrying out a magnificent general plan in easy and definite sections, has received careful and scientific consideration. We trust the outcome of the competition will lead to the appointment of the selected competitors as advisers to the Corporation of Dublin for a term of years. If so, it will redound to the reputation of the City Council, who will demonstrate by such action their acumen and commercial insight.

Early and Mediaeval Architecture of Ireland.

WE give up two of our insets to illustrations referred to in our article on page 41, of which we are, unfortunately, only able to give the first part this week. Many of the photographs reproduced have been lent by the Irish Board of Works.

Pavilion for Consumptives, Donnybrook.

WE illustrate plans of the Pavilion for Consumptives at Donnybrook by Messrs. Kaye-Parry & Ross, which want of space last week compelled us to hold over. The treatment of consumptives by open-air methods is being more and more universally adopted, and will, it is hoped, rob a dreaded disease of many of its terrors. Such problems are a useful exercise for architects, whose skill in devising means for fulfilling medical requirements is one of the many qualities which now, as in the past, render the profession useful and necessary for the purposes of a growing and developing civilization.

Belfast Villa Colony Asylum, Purdysburn.

WANT of space in our last number necessitated the holding over of this very interesting example of asylum design. We regret that it has been impossible to obtain plans, for the bifurcation of the ward blocks introduces some interesting problems in planning the solution of which is always of interest. It seems to us a pity when any public or semi-public body prefers to withhold plans, as their publication is not only a testimony of the architect's skill but is of use to the community, especially in such a case as this. The architects of the Colony Asylum are Messrs. Tulloch & Fitzsimons, of Belfast.

University College, Dublin.

The following is a list of the sub-contractors engaged in carrying out this work, which we illustrated last week:—

Cut Stone—James Kiernan.
Granite—William Osborn.
Fibrous Plaster Work—George Rome & Co., Ltd., Dublin and M. Credon, Dublin.
Structural Steel Work—Dorman, Long & Co., Middlesbrough.
Wrought Ironwork—J. & C. McGloughlin.
Cast Ironwork—MacFarlane & Co., Glasgow.
Locks—Chubb & Co., and James Gibbons.
Bronze Doors—Birmingham Art Guild.
Steel Casements, &c.—Henry Hope & Sons.
Grates and Mantels—Maguire & Gatchell.
Lifts—Maguire & Gatchell.
Sanitary Plumbing—Bairds, Ltd.
Sanitary Fittings—Doulton & Co., and Leeds Fireclay Co.
Heating—Haden & Co., Ltd.
Chemistry Fittings—T. & C. Martin, Ltd.
Sinks, &c.—Leeds Fireclay Co., Ltd.
Steam Supply and Hot Water Service—W. Curtis & Sons, Dublin.
Electric Lighting—J. Tierney, C.E. (Consulting Engineer); Edmundson's Lighting Corporation (Contractors); Drake & Gorham, Ltd. (Switchboards).
Wood-blocks—Duffy's Acme Flooring Co.
Tiling—O'Hara & Egan, Dublin.
Marble Paving—J. Logan, Dublin.
The clerk of works is Mr. Robert McGuiness.
Mr. R. M. Butler was the architect.

Belfast Abattoir.

The contractors for this building, which was illustrated and described in our last issue, were Messrs. H. & J. Martin, Ltd., Belfast. Runways and general equipment: Messrs. The North British Lifting and Moving Appliance Co. Glasgow. Lairage and other fittings, gates, and railings: Messrs. Musgrave & Co., Ltd., Belfast. Electric lighting and electric power supply: Messrs. Craig & Paton, Belfast. Steam and hot and cold water installation: Mr. A. Sayers, Belfast. Internal plumbing work to administrative block: Messrs. John Dowling & Sons., Ltd., Belfast. Refrigerating plant: Messrs. Arthur G. Enoch & Co., Ltd., London. Insulation to chill rooms: Messrs. James Rogerson & Sons, Liverpool. Electric clocks: Messrs. Gibson & Co., Ltd., Belfast. Furniture, administration block: Messrs. J. C. Mayrs & Co., Ltd., Belfast. Doors, locks, and furniture: Messrs. Jas. Gibbons, Wolverhampton. Digester: Messrs. Ernest Scott & Co., Ltd., London. Electric goods lift: Messrs. Smith, Major & Stevens, Northampton. Painting and distempering: Mr. Joseph M'Master, Belfast.

MEETINGS.

FRIDAY, JANUARY 12.

Glasgow Technical College.—Mr. J. Keppie, F.R.I.B.A., on "Old Glasgow Architecture." 7.45 p.m.

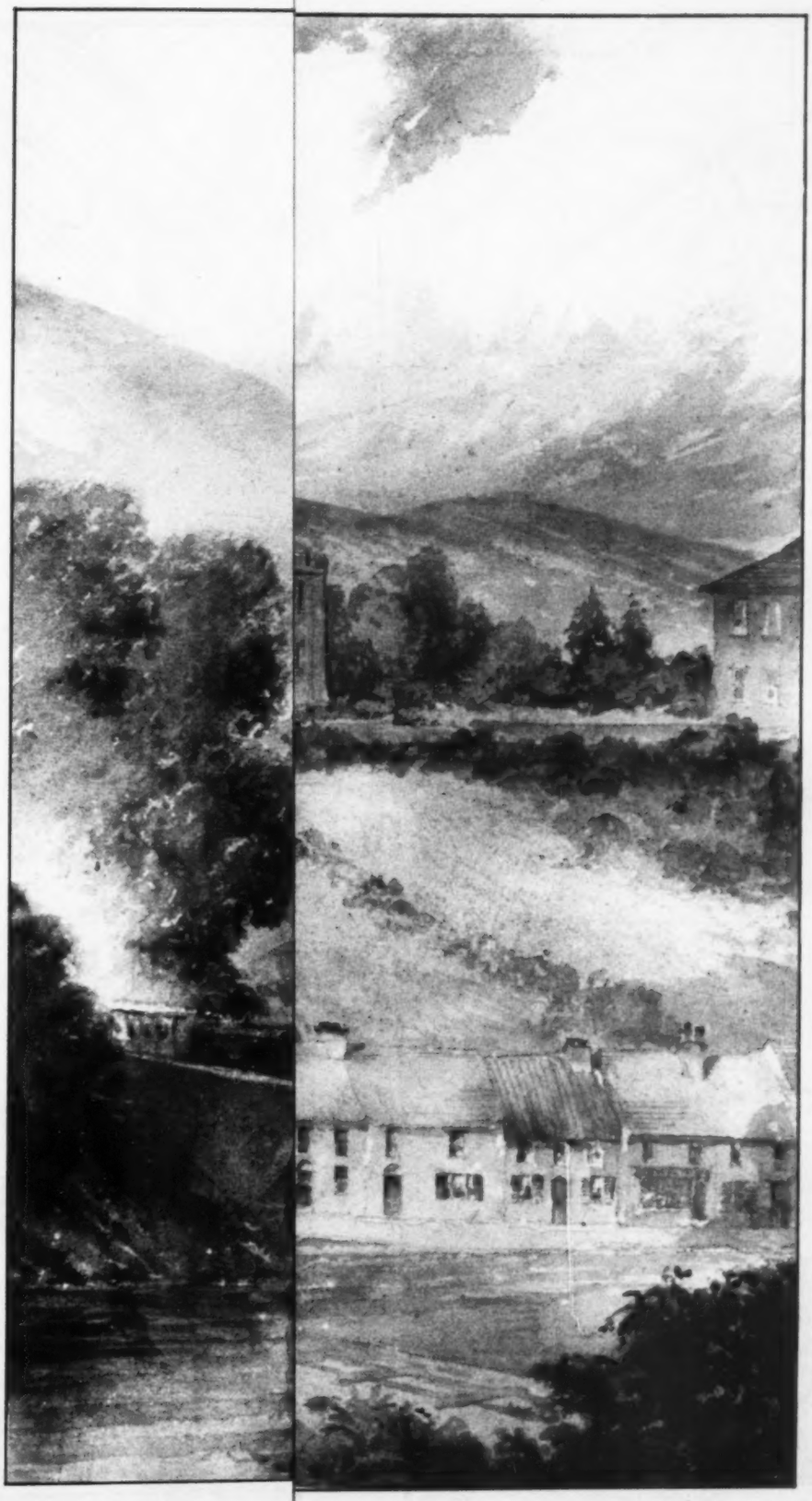
MONDAY, JANUARY 15.

Surveyors' Institution.—Ordinary general meeting. 5 p.m.

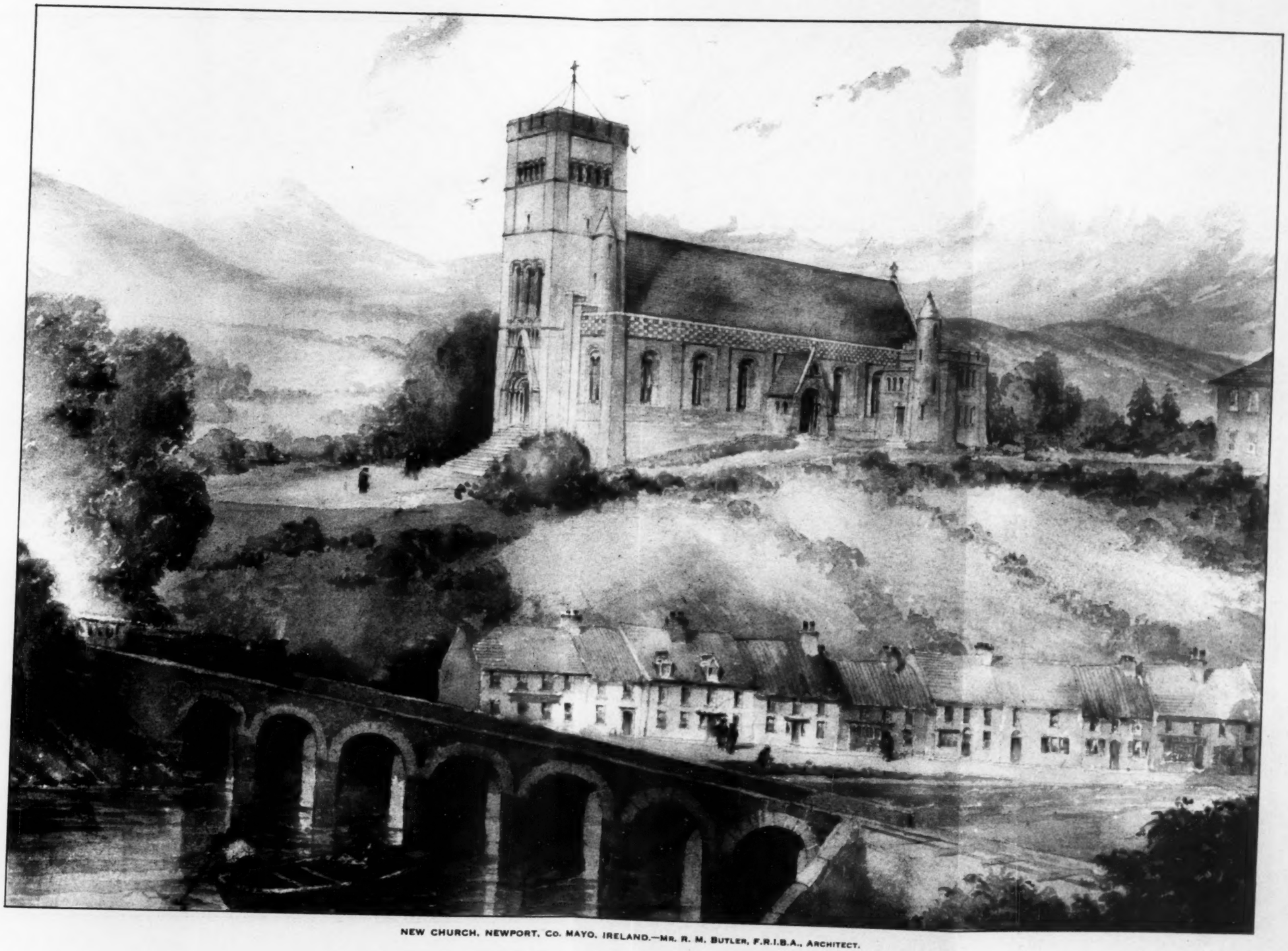
THURSDAY, JANUARY 18.

London School of Economics and Political Science (Clare Market, Portugal Street, W.C.).—Mr. Ernest J. P. Benn on "The Organisation of Trades." 5 p.m.

University Extension Lecture (at the L.C.C. Central School of Arts and Crafts, Southampton Row).—Mr. Banister Fletcher, F.R.I.B.A., will give a Comparative Analysis of Gothic and Renaissance Architecture. 6 p.m.



NEW CHURCH, NEWPORT, Co. MAYO, IRELAND.—MR. R. M. BUTLER, F.R.I.B.A., ARCHITECT.



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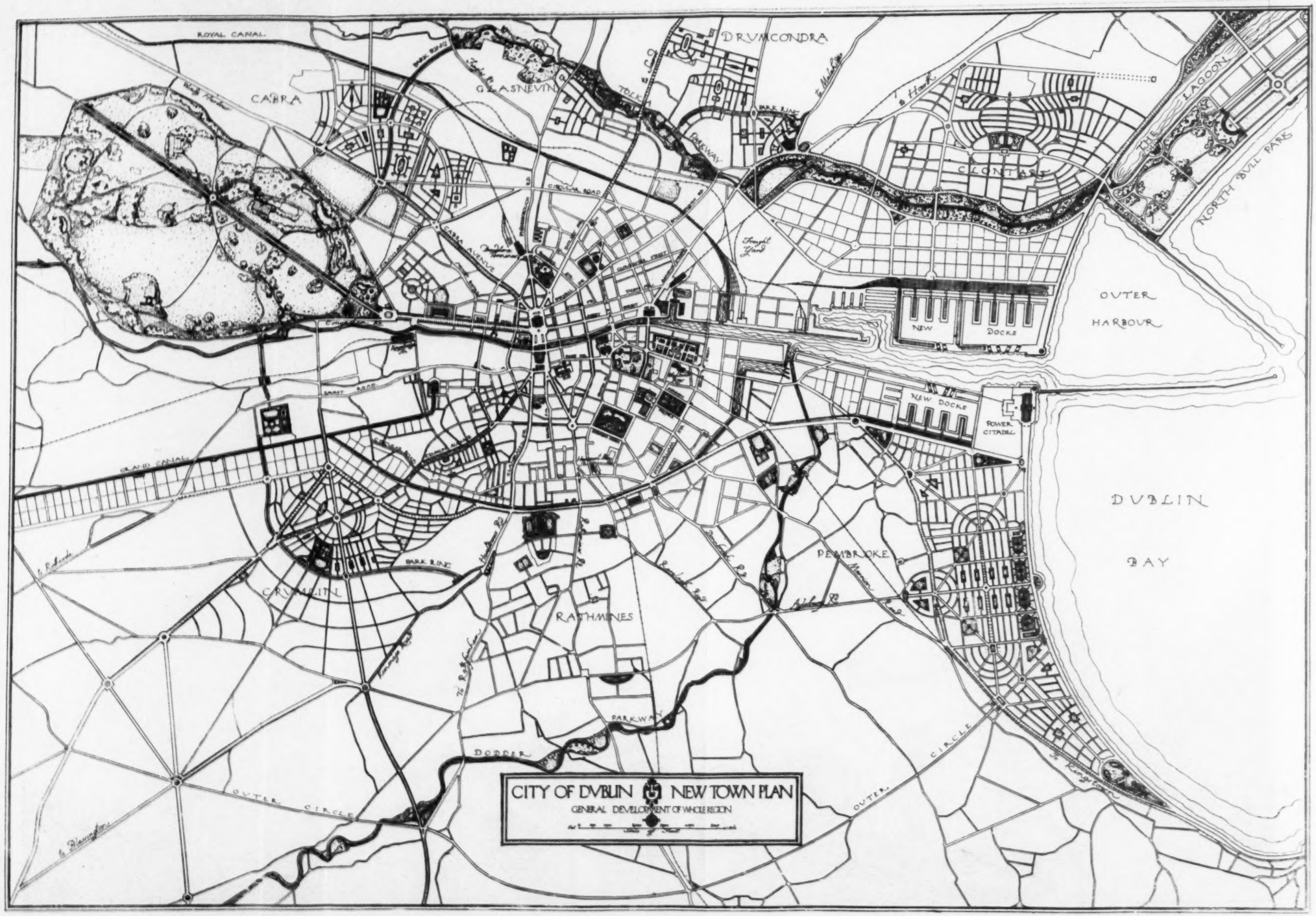


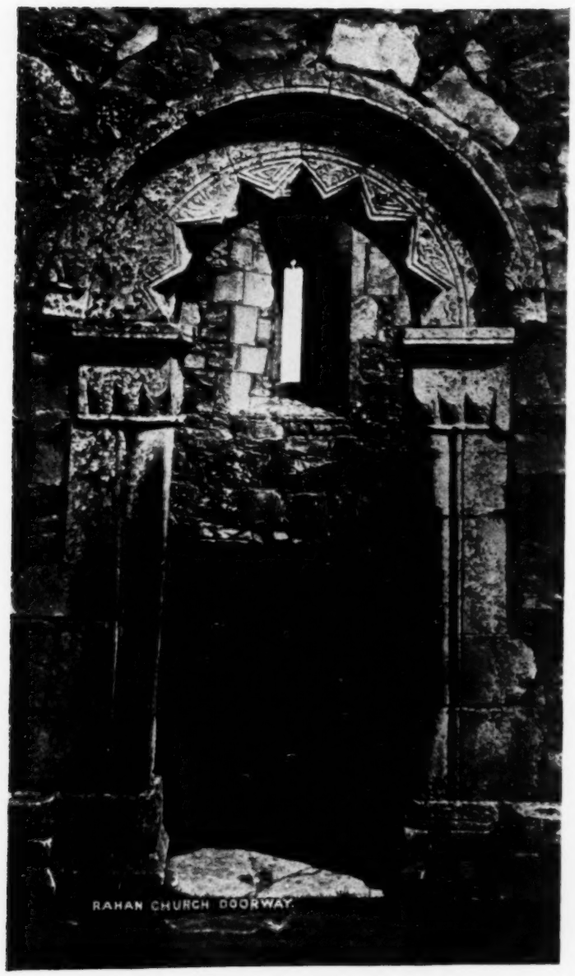
CITY OF DUBLIN NEW TOWN PLAN.

FIRST PREMIATED DESIGN, BY PROFESSOR PATRICK ABERCROMBIE AND MESSRS. SYDNEY A. & ARTHUR J. KELLY.

No. 1.—Gallerus Oratory, Co. Kerry.

No. 7.—Doorway, Clonfert Cathedral.

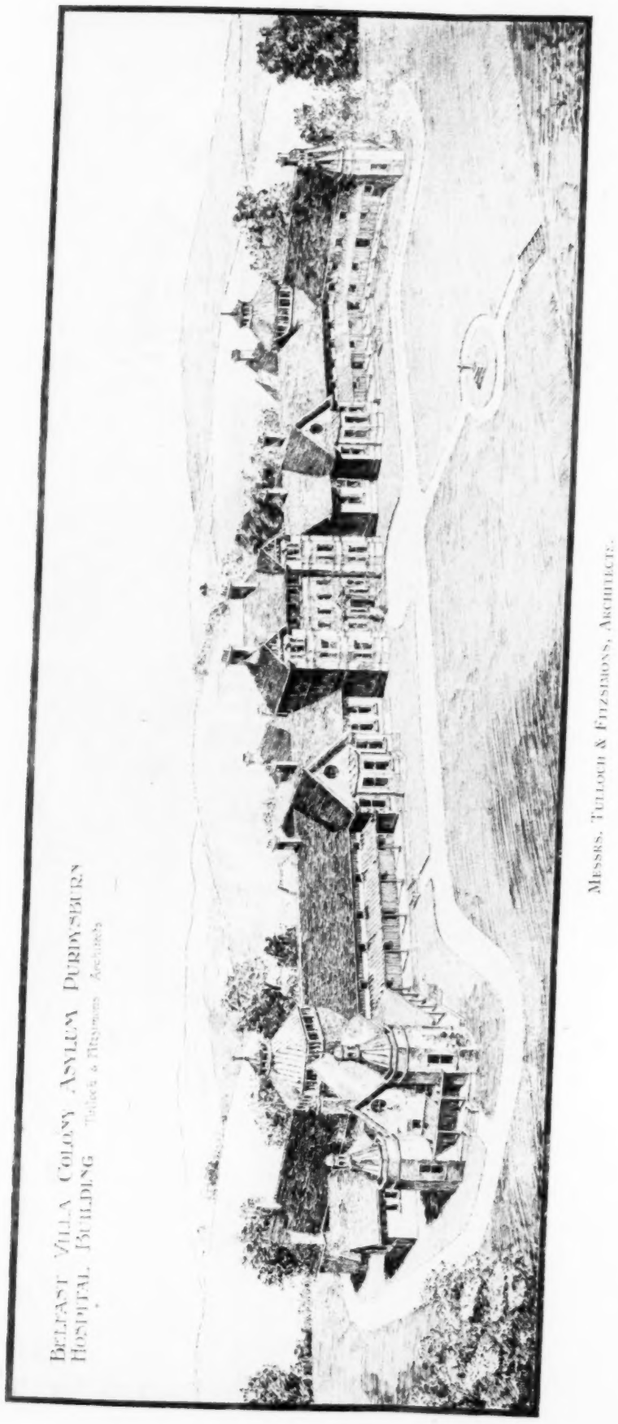
No. 2.—Doorway to Gallerus Oratory, Co. Kerry.



No. 4.—Rahan Church Doorway.

No. 9.—High Cross, Clanmacnoise.

No. 3.—Fr[illegible]ford Church Doorway.



No. 8.—Windows and Chancel Arch, Clonfert Cathedral.

No. 10.—Jerpoint Abbey.

"THE EARLY AND MEDIÆVAL ARCHITECTURE OF IRELAND."

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"THE EARLY AND MEDIÆVAL ARCHITECTURE OF IRELAND."

THE BUILDER, JANUARY 12, 1917.

THE EARLY AND MEDIAEVAL ARCHITECTURE OF IRELAND.

THAT the early and mediaeval architecture of Ireland is not better known and more closely studied, is doubtless, in large measure, due to the paucity of literature on the subject and to the comparative inaccessibility of its remains, rather than any inherent absence of interest in the subject itself. It is true that early and mediaeval architecture in Ireland never in any measure rivalled that of France or England in the vastness and richness of its edifices, but it possesses many varied and distinctive features, and a comparatively untrodden field for investigation in its partially unsolved problems, that present many attractions for the scholar and the student.

The history of architecture in Ireland is in many ways different from that of England. The periods during which the English realized their greatest architectural triumphs, and reared their noblest edifices, were comparatively barren in Ireland. It is unnecessary to enter into the causes, but history explains them by the social and political conditions of the country for many centuries after the so-called Norman invasion, which in reality emanated from Wales. To understand in satisfactory measure anything of the rise and progress of Irish architecture it is essential to have at least a superficial acquaintance with the history of the country; indeed, the same applies to any architecture.

The architectural progression of Ireland has for several centuries followed in its main lines that of England, with, however, distinctive features of its own, and with influences different from those of England operating. It is probable that under happier conditions, a much more important and pronounced mediaeval style would have been developed, and owing to the comparatively slower social evolution in Ireland during recent centuries, there might even have arisen what neither country now possesses, a distinctive national style of architecture.

The most interesting features of ancient Irish architecture are the early erection of stone-built oratories or churches, and the evolution and development of the Hiberno-Romanesque, which possesses many features distinguishing it from Anglo-Norman, and a Celtic character, which, to those who have studied it, is unmistakable. It is around these two points that most of the controversies concerning ancient Irish architecture have been waged. It is not possible to here enter upon a consideration of the various theories advanced, but it is necessary to briefly touch upon the main questions involved.

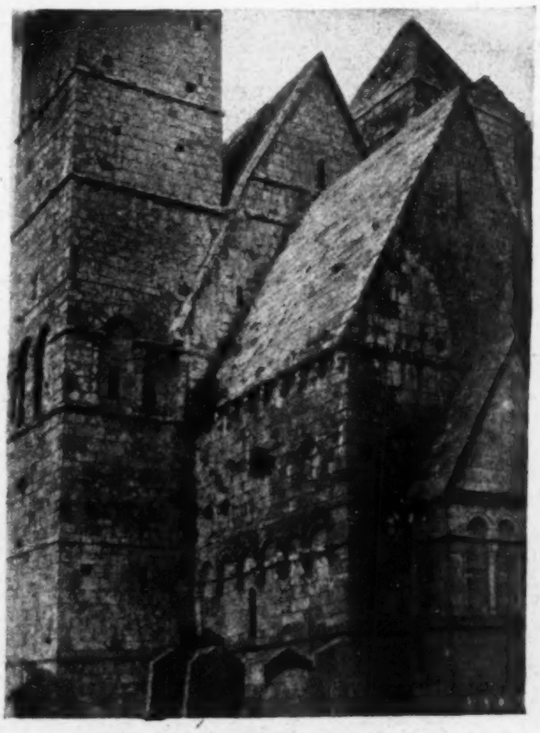
It was in the early part of the nineteenth century that the problems of Irish architecture first began to be seriously studied, although in every century there were those who kept alight the lamp of knowledge, howsoever feebly it may have flickered in surroundings the darkest.

The early nineteenth century pioneers of the study were, however, very ill equipped for their task, and their theories were often ludicrous in the extreme, imputing absurdly ancient dates, and propounding ideas as to origin, etc., mainly based on a fertile imagination.

The scientific and scholarly research work of the late George Petrie, LL.D., first made known by the publication of his learned and exhaustive essay on the "Origin of the Round Towers of Ireland," written in 1833, but not published until 1845, soon ended these speculative fancies, and founded a school of archaeology, which has since given many distinguished writers and scholars.

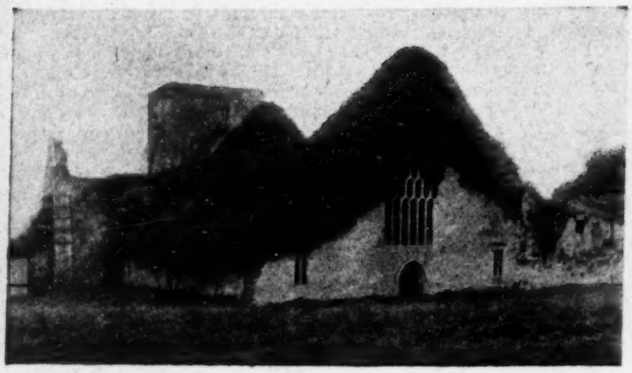
When Petrie dispelled the fanciful suggestions of the earlier archaeologists, he had then to contend with the new theories of J. H. Parker and others, who would not allow that the Irish were acquainted with the art of stone building prior to the Norman invasion, largely basing his belief on grounds which were the result of his conclusions in regard to Saxon architecture, and in support he vehemently asserted that there did not exist in all England a single Saxon remain! Modern study of Saxon architecture has not only shown that Parker's theory of analogy was founded on a misapprehension, but that the precise opposite conclusion to his may now be drawn, and the Irish credited with the possession of very early stone-built churches. The other main point of the controversy, the date of the development of the enriched Hiberno-Romanesque, is also tolerably well established in favour of the statement that the Irish possessed a well-developed Romanesque style before the entry of the Normans into the country. It is impossible to enter upon the various grounds and proofs for this, but apart from corroboration of the ancient records, which are not myths, but historical documents, there remains the fact of the established dates of the remarkable series of round towers, the clear progression of the slab, sand crosses culminating in the richly carved and unique high crosses of Ireland, the elaborately chased and jewelled metal work, and not least, the illuminated manuscripts, superior in richness and elegance of ornament and minute accuracy of craftsmanship to those of any other country in the world. If there were no trustworthy records of building at all, it would still be illogical to hold that such a people were ignorant of the elements of stone building, and it is an assertion requiring more convincing proof than has yet been advanced.

Ireland is very rich in primitive remains of early architecture, pillar stones, cromlechs, forts and cashels, with the dry stone oratories of the early missionaries. These, while not of great and strictly architectural interest, are of importance as evidence of an early state of civilisation and knowledge of primitive stone work. They were followed by the early stone and mortar churches such as Teampul Molaise, Teampul Benin, etc. The beehive cells and dry stone oratories were the earliest foundations in the fifth and sixth centuries. The most perfect specimen of a boat-shaped oratory remaining is that of Gallerus, in Kerry. This oratory is built of the green stone of the district, and is externally 23′.0″ by 10′.0″ and 16′.0″ high to the apex. Petrie considered that the beehive structures, although not the first erected of stone, were the earliest Christian structures in Ireland. Later come the oratories of the latter end of the eighth century. These were rectangular buildings, with upright walls and high-pitched stone roofs. In the development of plan there may be observed a decided resemblance between the early Irish and Saxon churches. It is remarkable that the apsidal end was never employed in Ireland, although traces are said to have been found at Cashel, and at Kilmalkedar indications are to be seen of an early apse, but the point has never been properly investigated. The late Sir Thomas N. Deane, Inspector of National Monuments, in 1876, called attention to these indications of a change of form in the east end of Cormac's Chapel, which would lead to a supposition that it had an apsidal termination. In 1878 he wrote of Kilmalkedar: "the original chancel, which has been rebuilt, probably to extend its pro-



No. 6.—CORMAC'S CHAPEL.

No. 13.—SEDILIA, HOLY CROSS ABBEY.



No. 11.—HOLY CROSS ABBEY FROM THE WEST.

portions, shows at either sides the jambs, sills, and portion of arches of the original chancel windows. There can be no doubt from what remains of these windows that they occupied a a position in a semi-circular or curvilinear eastern end." He adds: "The absence of such terminations to ecclesiastical buildings in Ireland generally, adds an interest to these two instances of a probable contrary." The suggestion that the typical English east end was inspired by Irish example, is improbable; it is much more likely that both came from a common source. Sir George Gilbert Scott, in his "History of English Church Building," says of the square ended chancel: "A custom peculiar to these isles, older than the invasion of the Normans, of the Danes, and of the Saxons, is not one lightly to be abandoned to an ignorant caprice, or a morbid craving after novelties."

A characteristic feature of early Irish churches which continued during several phases, was the square-headed doorway with inclined jambs. In some cases the jambs were ornamental on the face, as at Teampul Chronain, County Clare, where there is a set of lozenge ornament. In some examples, like that at Maghera, County Derry, the square doorway attains to considerable architectural pretensions. The deep lintel is sculptured, and, with inclined jambs, imparts to the whole a startlingly Greek or even Egyptian flavour. Another remarkable example of a square-headed doorway with inclined jambs, and a sort of architrave, is that at Aghowle, County Wicklow. A study of Irish ornament, particularly the spiral and the key or fret patterns, so prominent a feature in the incised grave slabs, leaves no room for doubt that these early Irish builders possessed a more than passing acquaintance with Greek art, the full extent of which has not yet been adequately investigated. In his work on "Ireland and the Celtic Church," the late Professor George T. Stokes throws a good deal of light upon the resemblance to Greek and Eastern forms, observable in certain details of early Irish art. He shows the intimate connection of Ireland with Egypt and Syria in the earlier centuries, and quotes many authorities. Stokes says that "many of these facts only came to light in recent years, principally through the labours of the eminent French scholar and archæologist Le Blant." He adds that a visit to St. Molaise's monastery on Inismurray will give a true idea of an eastern monastery, of which it is an exact reproduction; that there is documentary evidence that they were constructed on the same plan, and that the Celtic clergy and architects of the century knew this was the case, and designedly constructed their buildings on Syrian models. Pilgrimages from Ireland to Egypt were not unknown down to the close of the eighth century.

The monks were the early architects. They were acquainted with eastern and Italian art, continually travelling to and fro on missionary enterprise, or as pilgrims; for the footprints of the early Irish missionaries may be traced all over Europe. Two good examples of rectangular Irish oratory are MacDara' Connemara, and Teampul Benin, on A Island, the largest of the Arran group i Bay, remarkable for the wealth of ea tectural remains. The great number small churches still existing, and the a large churches, is remarkable, but t monastic character of the early Irish based on the rule of the Egyptian explains this. Although there were no regular authority was defined unti later period. The ascetics built small or oratories, and by their zealous piety adherents.

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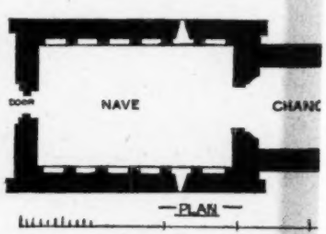

THE SMALL IRISH CHURCH WITH C

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Characteristics of this style are—the high-pitched roofs, the steep gables or pediments over the doorways, the frequent absence of columns in the recessed orders of the doorways, there being, instead, almost square orders, [illegible] panum, completely filled with rows of sculpture, the enriched and inclined jambs, the capitals treated as an entablature or continuous band of carving, combine to invest it with distinction and character; no other doorway remaining possesses all these features in the same degree. In its details it bears far more affinity to Saxon than to Norman work.

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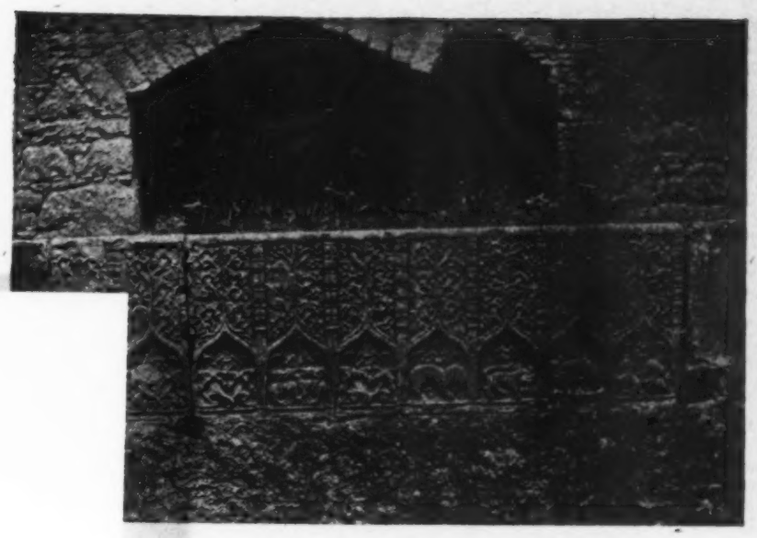

No. 15.—LATE IRISH ALTAR, NORTH TRANSEPT, CASHEL.

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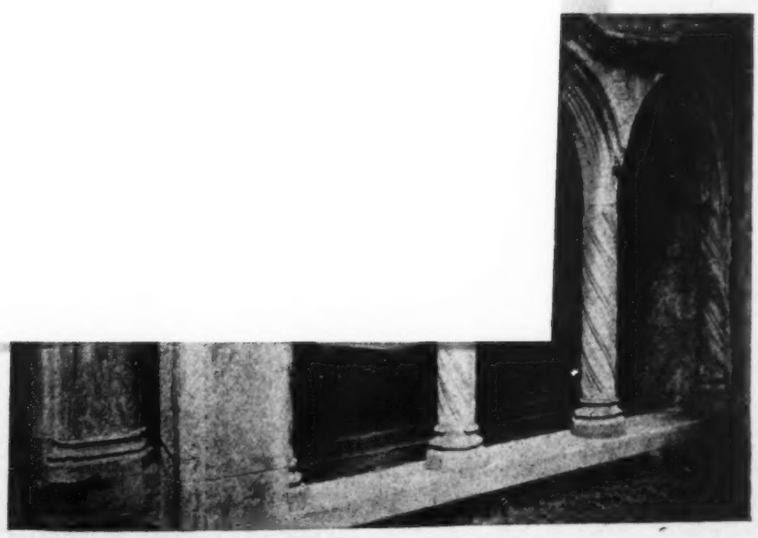
There is mention in four separate annals, compiled A.D. 1123–1627, that the round tower at Slane was burnt, at dates variously given as A.D. 945–949. The first recorded builder of one, that of Tomgreaney, of which no trace now remains, died A.D. 964. Brian Boru is said to have built thirty-two of these towers. O'Rourke's Tower at Clonmacnoise is said to have been in existence in 964. Many of those now remaining are in a wonderful state of preservation, and are picturesque features in the landscape.

The use of the round towers, no less than their origin, excited the fiercest controversy in the early nineteenth century, all sorts of theories being advanced, but there can be no doubt that they were Christian ecclesiastical towers, which may or may not have been used as places of refuge from danger, for the security of valuables, or as bell towers. They seem rather unsuitable for the latter purpose, but it was found, by experiment, that an ordinary dinner bell, rung at the top, was heard as plainly 100 ft. away as if rung on the level.

The towers are scattered all over the country; two excellent examples are within easy reach of Dublin, at Lusk and at Clondalkin respectively. They are all built detached, except where later churches were erected against them. They are similar in character and design to early Italian types, and examples also exist in France, and in Scotland.

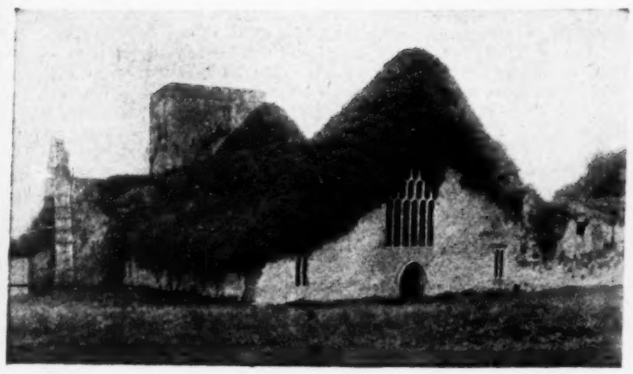
(To be concluded in our next issue.)



No. 14.—"WAKING PLACE," HOLY CROSS ABBEY.

The Artisans', Labourers', & General Dwellings Co., Ltd.

December 31st was the 50th anniversary of the founding of the Artisans', Labourers', & General Dwellings Company, Limited, which began its career with a nominal capital of £250,000. This is now increased to £3,250,000 of which £2,939,230 is paid up. The company to-day owns 250 acres of freehold estates in the Metropolis and provides 8,682 dwellings and shops, accommodating more than 35,000 people. The work of the company is benevolent for it benefits alike those who occupy the buildings and those who provide them. The cottages are only empty during the periods of repair on changes of tenancy, and the shareholders for the past 38 years have always received a dividend of not less than four per cent. per annum.



No. 11.—HOLY CROSS ABBEY FROM THE WEST.

No. 12.—HOLY CROSS ABBEY, FROM THE EAST.

portions, shows at either sides the jambs, sills, and portion of arches of the original chancel windows. There can be no doubt from what remains of these windows that they occupied a a position in a semi-circular or curvilinear eastern end." He adds: "The absence of such terminations to ecclesiastical buildings in Ireland generally, adds an interest to these two instances of a probable contrary." The suggestion that the typical English east end was inspired by Irish example, is improbable; it is much more likely that both came from a common source. Sir George Gilbert Scott, in his "History of English Church Building," says of the square ended chancel: "A custom peculiar to these isles, older than the invasion of the Normans, of the Danes, and of the Saxons, is not one lightly to be abandoned to an ignorant caprice, or a morbid craving after novelties."

A characteristic feature of early Irish churches which continued during several phases, was the square-headed doorway with inclined jambs. In some cases the jambs were ornamental on the face, as at Teampul Chronain, County Clare, where there is a set of lozenge ornament. In some examples, like that at Maghera, County Derry, the square doorway attains to considerable architectural pretensions. The deep lintel is sculptured, and, with inclined jambs, imparts to the whole a startlingly Greek or even Egyptian flavour. Another remarkable example of a square-headed doorway with inclined jambs, and a sort of architrave, is that at Aghowle, County Wicklow. A study of Irish ornament, particularly the spiral and the key or fret patterns, so prominent a feature in the incised grave slabs, leaves no room for doubt that these early Irish builders possessed a more than passing acquaintance with Greek art, the full extent of which has not yet been adequately investigated. In his work on "Ireland and the Celtic Church," the late Professor George T. Stokes throws a good deal of light upon the resemblance to Greek and Eastern forms, observable in certain details of early Irish art. He shows the intimate connection of Ireland with Egypt and Syria in the earlier centuries, and quotes many authorities. Stokes says that "many of these facts only came to light in recent years, principally through the labours of the eminent French scholar and archæologist Le Blant." He adds that a visit to St. Molaise's monastery on Inismurray will give a true idea of an eastern monastery, of which it is an exact reproduction; that there is documentary evidence that they were constructed on the same plan, and that the Celtic clergy and architects of the century knew this was the case, and designedly constructed their buildings on Syrian models. Pilgrimages from Ireland to Egypt were not unknown down to the close of the eighth century.

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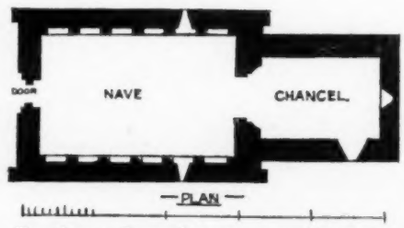
The small early Irish churches were built in lime mortar, with walls of full height, and were usually about 15 feet long by 10 feet wide, inside measurement, with a small window in the east end, and a square-headed doorway, having converging jambs, in the western gable.

Later, the square-ended chancel with chancel arch was introduced; it was invariably of very modest dimensions and the size of the church itself continued to be small.

The round arched head was introduced, and this style, up to the Norman invasion, has been described as the Hiberno-Romanesque.

Most of the early churches of the entablature period remaining are devoid of ornament,



THE SMALL IRISH CHURCH WITH CHANCEL.

and these Petrie considered belonged to the sixth or seventh century. Miss Stokes ascribed them to the eighth or ninth century.

The building of the little church of Iniscaltra, about A.D. 1008–1016 by Brian Boru, about fifty years prior to the Norman invasion of England, marks the transition into the enriched round-arched style of Ireland. Many authorities who have made a special study of the subject, hold that a much earlier date than the building of Iniscaltra may be inferred for the start of Romanesque. Churches of greater importance and gradually increasing richness were built during this period—Miss Margaret Stokes places it at about A.D. 1007 to A.D. 1168. The Celtic tomb at Cashel, Cormac's chapel, the Church of Aghadoe, the Church of Tuam, the church at Clonfert, the church of Queen Dervorgilla at Clonmacnoise, mark a certain sequence in the development of the style.

Characteristics of this style are—the high-pitched roofs, the steep gables or pediments over the doorways, the frequent absence of columns in the recessed orders of the doorways, there being, instead, almost square orders, with rounded arrises, the surfaces being frequently completely covered with carving, or occasionally enriched with a sort of billet mould. The mouldings and enrichments have a character of their own, distinct from Anglo-Norman work, the traditional Celtic ornament influencing the detail to the end. An arcaded system is also characteristic of the style, as at Cormac's Chapel. This remarkable structure, the richest and best known example of Irish Romanesque, is unique in its way. It is in good condition, and has fortunately suffered but little from restoration. The vaulting remains, and one of its most remarkable features is the treatment of the square tower, which somewhat recalls Lombardic and Rhenish Romanesque work. It has the typical Irish high-pitched stone roofs, formed of slabs 8 ins. thick. The plan does not greatly differ from the normal Irish type—the walls are very thick. Mr. A. C. Champneys, the author of a very valuable work on Irish ecclesiastical architecture, disputes the early date assigned to Cormac's Chapel, contending that this is not the church mentioned in the annals, but a later building erected under Norman influence. It must be admitted that in some of its details, notably the doorway, it is not so characteristically Irish as certain other remains, but none the less it has other distinctive characteristics—the tower treatment and the roof alone stamp it. Even the doorways themselves have a certain distinction. History and tradition have it that Cormac's Chapel was built by Cormac MacCullinen, King of Munster and Bishop of Cashel, who was killed A.D. 908. At Cashel is the very remarkable tomb assigned by Miss Stokes to A.D. 1123, quite a wonderful piece of work, and unlike anything of the sort we can recall. It is unmistakably of purely Celtic inspiration, and it is obvious that it could not be the tomb of Murrough O'Brien, for it is plainly of very much earlier date.

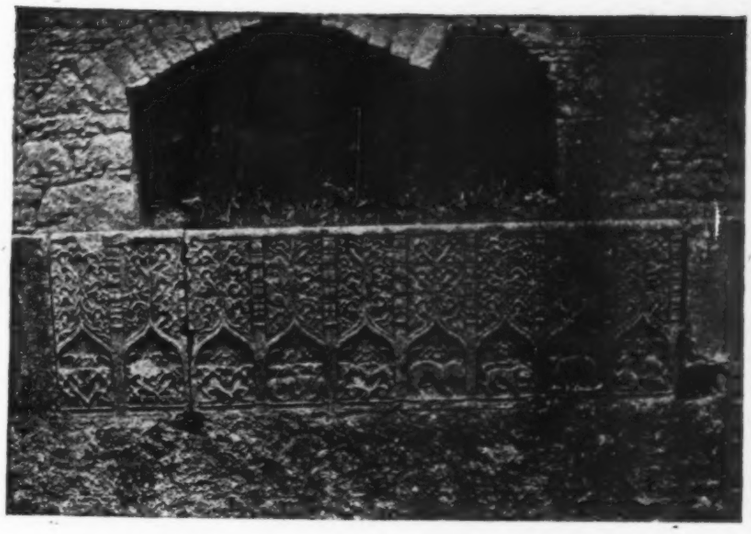
In other parts of Ireland remains which unquestionably fell under Norman inspiration display marked divergencies of character, conforming more to the familiar Norman types.

The Cathedral of Tuam contains but a small portion of the Romanesque church, and has been almost rebuilt, but the Celtic chancel arch remains, and was lauded by Ruskin as one of the most perfect pieces of Romanesque.

The doorway of Clonfert Cathedral is certainly the most rich and elaborate piece of Irish Romanesque detail extant. The most cursory examination discloses its wide divergence of character from ordinary Norman detail. The extremely high-pitched pediment, the tympanum, completely filled with rows of sculpture, the enriched and inclined jambs, the capitals treated as an entablature or continuous band of carving, combine to invest it with distinction and character; no other doorway remaining possesses all these features in the same degree. In its details it bears far more affinity to Saxon than to Norman work.

The date of the halcyon period of Irish Romanesque is of some importance, but space does not permit of here fully entering upon the

arguments. Miss Stokes, for instance, gives the date of Cormac's chapel as A.D. 1127; Petrie assigned it to A.D. 1134; tradition says A.D. 908. When Petrie arrived at his conclusion in 1845, he was almost overawed by the vehemence of Parker, then one of the leading authorities on mediæval architecture, who asserted that there was not a vestige of Saxon work left in any of the English cathedrals, and went so far as to declare that the Irish, even in the twelfth century, were unacquainted with the art of cutting or carving stone! Parker was responsible for a long controversy on tenth century architecture in the columns of the *Gentleman's Magazine* in 1845. It is interesting to note that in the fourth edition of his "A B C of Gothic Architecture," published shortly before his death, Parker retracted some of his earlier opinions on Saxon architecture. In it he stated: "The Saxons appear to have been more advanced in the fine arts, such as sculpture, than the Normans. . . . Recent observations seem to show that the Saxons were more advanced than the Normans at the time of the Conquest, their work was more highly finished, had more ornament, and they used fine jointed masonry, while the Normans used wide jointed." The bearing of this on early Irish architecture is obvious, particularly in the light of recent study of Saxon work on the one hand and on the other of the influence of Lombardic art on Irish and other early art. (See Leader Scott on the Comacini Masters, Signor Rivoira, Signor Cattaneo, and other Italian writers on the Lombardic influence, &c.). The late Sir George Gilbert Scott, R.A., writing of the Church of St. Regulus at St. Andrews, remarks that "he imagines it to be anterior to the Norman Conquest. . . . that it is of parallel character to Cormac's Chapel, and the character of tenth century Lombardic work noticeable in Cormac's Chapel. . . ." Also he refers to the resemblance of the shafts in Cormac's Chapel to those of the tenth century in St. Pantaleon at Cologne. It is reasonable to consider in this connection the existence of an exceptionally high state of culture in Ireland from the sixth to the tenth century, as evidenced by the annals, and demonstrated by such writers as Montalembert, Heinrich Zimmer, and Mrs. Alice Stopford Green. Without being dogmatic, one may venture to suggest that there are grounds for enquiry whether some earlier date than the twelfth century may not reasonably be assigned to the developed Irish Romanesque. Seeing the high standard of art reached in the carving of the high crosses, not to speak of the arts of illuminating and metal work, it might fairly be inferred that this skill in stone carving was not confined to monumental crosses, but extended to the embellishment of the stone-built churches. Mr. Champneys, who is a somewhat sceptical critic of early Irish architecture, admits that "from the examples still remaining it may well be doubted whether the impression that such carving was almost wholly confined to the crosses, is not somewhat exaggerated." It is a rather striking admission from one so critical, and decidedly strengthens the view that there may be claimed, for Irish Romanesque, evidence of a gradual progression in the work from the ninth to the eleventh century, involving the use of ornamental stone-work.



No. 15.—Late Irish Altar, North Transept, Cashel.

One cannot leave the subject of Irish Romanesque in any note, howsoever brief, without at least referring to those remarkable features of early Irish architecture, the round towers and the high crosses. Although not, strictly speaking, peculiar to Ireland, no other country possesses towers in such number or attained to such perfection in the crosses.

It was around the subject of the origin of the towers that the fiercest controversy raged amongst the antiquaries of the early nineteenth century, until finally settled by Petrie's research. According to Miss Stokes there were at the beginning of the nineteenth century still remaining no less than 118 round towers. By 1878 the number had fallen to 78. In the interval no less than forty towers had disappeared, apparently destroyed by vandalism—evidence of the shocking immunity such practices have enjoyed in modern times in Ireland.

Miss Stokes classified these towers into first, second, and third periods. The masonry varied from rough field stones to sandstone in squared courses and well-dressed ashlar. The average height is from 100 ft. to 120 ft., the diameter 50 ft., becoming thinner towards the top. The average thickness of walling at the base is 3 ft. 6 in. to 4 ft. Internally the towers have three or more storeys, with corbels or offsets. There are also found projecting stones shaped like hooks. The entrance is by a doorway 6 ft. to 15 ft. above the ground.

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The use of the round towers, no less than their origin, excited the fiercest controversy in the early nineteenth century, all sorts of theories being advanced, but there can be no doubt that they were Christian ecclesiastical towers, which may or may not have been used as places of refuge from danger, for the security of valuables, or as bell towers. They seem rather unsuitable for the latter purpose, but it was found, by experiment, that an ordinary dinner bell, rung at the top, was heard as plainly 100 ft. away as if rung on the level.

The towers are scattered all over the country; two excellent examples are within easy reach of Dublin, at Lusk and at Clondalkin respectively. They are all built detached, except where later churches were erected against them. They are similar in character and design to early Italian types, and examples also exist in France, and in Scotland.

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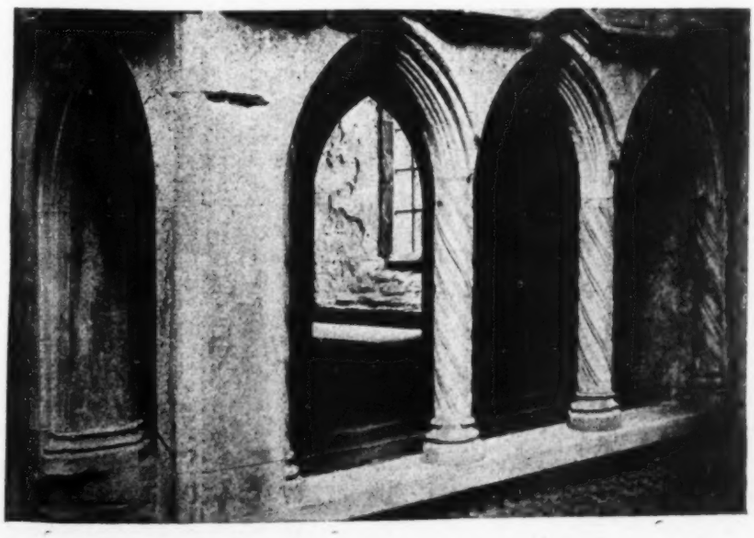


No. 14.—"Waking Place," Holy Cross Abbey.

The Artisans', Labourers', & General Dwellings Co., Ltd.

December 31st was the 50th anniversary of the founding of the Artisans', Labourers', & General Dwellings Company, Limited, which began its career with a nominal capital of £250,000. This is now increased to £3,250,000 of which £2,939,230 is paid up. The company to-day owns 250 acres of freehold estates in the Metropolis and provides 8,682 dwellings and shops, accommodating more than 35,000 people. The work of the company is benevolent for it benefits alike those who occupy the buildings and those who provide them. The cottages are only empty during the periods of repair on changes of tenancy, and the shareholders for the past 38 years have always received a dividend of not less than four per cent. per annum.

No. 11.—HOLY CROSS ABBEY FROM THE WEST.

No. 12.—HOLY CROSS ABBEY, FROM THE EAST.

portions, shows at either sides the jambs, sills, and portion of arches of the original chancel windows. There can be no doubt from what remains of these windows that they occupied a a position in a semi-circular or curvilinear eastern end." He adds: "The absence of such terminations to ecclesiastical buildings in Ireland generally, adds an interest to these two instances of a probable contrary." The suggestion that the typical English east end was inspired by Irish example, is improbable; it is much more likely that both came from a common source. Sir George Gilbert Scott, in his "History of English Church Building," says of the square ended chancel: "A custom peculiar to these isles, older than the invasion of the Normans, of the Danes, and of the Saxons, is not one lightly to be abandoned to an ignorant caprice, or a morbid craving after novelties."

A characteristic feature of early Irish churches which continued during several phases, was the square-headed doorway with inclined jambs. In some cases the jambs were ornamental on the face, as at Teampul Chronain, County Clare, where there is a set of lozenge ornament. In some examples, like that at Maghera, County Derry, the square doorway attains to considerable architectural pretensions. The deep lintel is sculptured, and, with inclined jambs, imparts to the whole a startlingly Greek or even Egyptian flavour. Another remarkable example of a square-headed doorway with inclined jambs, and a sort of architrave, is that at Aghowle, County Wicklow. A study of Irish ornament, particularly the spiral and the key or fret patterns, so prominent a feature in the incised grave slabs, leaves no room for doubt that these early Irish builders possessed a more than passing acquaintance with Greek art, the full extent of which has not yet been adequately investigated. In his work on "Ireland and the Celtic Church," the late Professor George T. Stokes throws a good deal of light upon the resemblance to Greek and Eastern forms, observable in certain details of early Irish art. He shows the intimate connection of Ireland with Egypt and Syria in the earlier centuries, and quotes many authorities. Stokes says that "many of these facts only came to light in recent years, principally through the labours of the eminent French scholar and archæologist Le Blant." He adds that a visit to St. Molaise's monastery on Inismurray will give a true idea of an eastern monastery, of which it is an exact reproduction; that there is documentary evidence that they were constructed on the same plan, and that the Celtic clergy and architects of the century knew this was the case, and designedly constructed their buildings on Syrian models. Pilgrimages from Ireland to Egypt were not unknown down to the close of the eighth century.

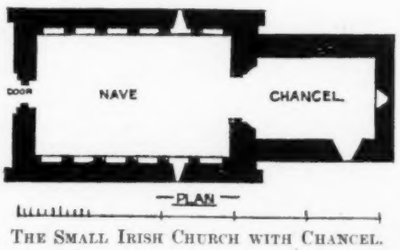
The monks were the early architects. They were acquainted with eastern and Italian art, continually travelling to and fro on missionary enterprise, or as pilgrims; for the footprints of the early Irish missionaries may be traced all over Europe. Two good examples of the small rectangular Irish oratory are MacDara's Church, Connemara, and Teampul Benin, on Arranmore Island, the largest of the Arran group in Galway Bay, remarkable for the wealth of early architectural remains. The great number of these small churches still existing, and the absence of large churches, is remarkable, but the purely monastic character of the early Irish Church, based on the rule of the Egyptian ascetics, explains this. Although there were bishops, no regular authority was defined until a much later period. The ascetics built small churches or oratories, and by their zealous piety attracted adherents.

The small early Irish churches were built in lime mortar, with walls of full height, and were usually about 15 feet long by 10 feet wide, inside measurement, with a small window in the east end, and a square-headed doorway, having converging jambs, in the western gable.

Later, the square-ended chancel with chancel arch was introduced; it was invariably of very modest dimensions and the size of the church itself continued to be small.

The round arched head was introduced, and this style, up to the Norman invasion, has been described as the Hiberno-Romanesque.

Most of the early churches of the entablature period remaining are devoid of ornament,



THE SMALL IRISH CHURCH WITH CHANCEL.

and these Petrie considered belonged to the sixth or seventh century. Miss Stokes ascribed them to the eighth or ninth century.

The building of the little church of Iniscaltra, about A.D. 1008–1016 by Brian Boru, about fifty years prior to the Norman invasion of England, marks the transition into the enriched round-arched style of Ireland. Many authorities who have made a special study of the subject, hold that a much earlier date than the building of Iniscaltra may be inferred for the start of Romanesque. Churches of greater importance and gradually increasing richness were built during this period—Miss Margaret Stokes places it at about A.D. 1007 to A.D. 1168. The Celtic tomb at Cashel, Cormac's chapel, the Church of Aghadoe, the Church of Tuam, the church at Clonfert, the church of Queen Dervorgilla at Clonmacnoise, mark a certain sequence in the development of the style.

Characteristics of this style are—the high-pitched roofs, the steep gables or pediments over the doorways, the frequent absence of columns in the recessed orders of the doorways, there being, instead, almost square orders, with rounded arrises, the surfaces being frequently completely covered with carving, or occasionally enriched with a sort of billet mould. The mouldings and enrichments have a character of their own, distinct from Anglo-Norman work, the traditional Celtic ornament influencing the detail to the end. An arcaded system is also characteristic of the style, as at Cormac's Chapel. This remarkable structure, the richest and best known example of Irish Romanesque, is unique in its way. It is in good condition, and has fortunately suffered but little from restoration. The vaulting remains, and one of its most remarkable features is the treatment of the square tower, which somewhat recalls Lombardic and Rhenish Romanesque work. It has the typical Irish high-pitched stone roofs, formed of slabs 8 ins. thick. The plan does not greatly differ from the normal Irish type—the walls are very thick. Mr. A. C. Champneys, the author of a very valuable work on Irish ecclesiastical architecture, disputes the early date assigned to Cormac's Chapel, contending that this is not the church mentioned in the annals, but a later building erected under Norman influence. It must be admitted that in some of its details, notably the doorway, it is not so characteristically Irish as certain other remains, but none the less it has other distinctive characteristics—the tower treatment and the roof alone stamp it. Even the doorways themselves have a certain distinction. History and tradition have it that Cormac's Chapel was built by Cormac MacCullinen, King of Munster and Bishop of Cashel, who was killed A.D. 908. At Cashel is the very remarkable tomb assigned by Miss Stokes to A.D. 1123, quite a wonderful piece of work, and unlike anything of the sort we can recall. It is unmistakably of purely Celtic inspiration, and it is obvious that it could not be the tomb of Murrough O'Brien, for it is plainly of very much earlier date.

In other parts of Ireland remains which unquestionably fell under Norman inspiration display marked divergencies of character, conforming more to the familiar Norman types.

The Cathedral of Tuam contains but a small portion of the Romanesque church, and has been almost rebuilt, but the Celtic chancel arch remains, and was lauded by Ruskin as one of the most perfect pieces of Romanesque.

The doorway of Clonfert Cathedral is certainly the most rich and elaborate piece of Irish Romanesque detail extant. The most cursory examination discloses its wide divergence of character from ordinary Norman detail. The extremely high-pitched pediment, the tympanum, completely filled with rows of sculpture, the enriched and inclined jambs, the capitals treated as an entablature or continuous band of carving, combine to invest it with distinction and character; no other doorway remaining possesses all these features in the same degree. In its details it bears far more affinity to Saxon than to Norman work.

The date of the halcyon period of Irish Romanesque is of some importance, but space does not permit of here fully entering upon the

arguments. Miss Stokes, for instance, gives the date of Cormac's chapel as A.D. 1127; Petrie assigned it to A.D. 1134; tradition says A.D. 908. When Petrie arrived at his conclusion in 1845, he was almost overawed by the vehemence of Parker, then one of the leading authorities on mediæval architecture, who asserted that there was not a vestige of Saxon work left in any of the English cathedrals, and went so far as to declare that the Irish, even in the twelfth century, were unacquainted with the art of cutting or carving stone! Parker was responsible for a long controversy on tenth century architecture in the columns of the *Gentleman's Magazine* in 1845. It is interesting to note that in the fourth edition of his "A B C of Gothic Architecture," published shortly before his death, Parker retracted some of his earlier opinions on Saxon architecture. In it he stated: "The Saxons appear to have been more advanced in the fine arts, such as sculpture, than the Normans. . . . Recent observations seem to show that the Saxons were more advanced than the Normans at the time of the Conquest, their work was more highly finished, had more ornament, and they used fine jointed masonry, while the Normans used wide jointed." The bearing of this on early Irish architecture is obvious, particularly in the light of recent study of Saxon work on the one hand and on the other of the influence of Lombardic art on Irish and other early art. (See Leader Scott on the Comacini Masters, Signor Rivoira, Signor Cattaneo, and other Italian writers on the Lombardic influence, &c.). The late Sir George Gilbert Scott, R.A., writing of the Church of St. Regulus at St. Andrews, remarks that "he imagines it to be anterior to the Norman Conquest. . . . that it is of parallel character to Cormac's Chapel, and the character of tenth century Lombardic work noticeable in Cormac's Chapel. . . ." Also he refers to the resemblance of the shafts in Cormac's Chapel to those of the tenth century in St. Pantaleon at Cologne. It is reasonable to consider in this connection the existence of an exceptionally high state of culture in Ireland from the sixth to the tenth century, as evidenced by the annals, and demonstrated by such writers as Montalembert, Heinrich Zimmer, and Mrs. Alice Stopford Green. Without being dogmatic, one may venture to suggest that there are grounds for enquiry whether some earlier date than the twelfth century may not reasonably be assigned to the developed Irish Romanesque. Seeing the high standard of art reached in the carving of the high crosses, not to speak of the arts of illuminating and metal work, it might fairly be inferred that this skill in stone carving was not confined to monumental crosses, but extended to the embellishment of the stone-built churches. Mr. Champneys, who is a somewhat sceptical critic of early Irish architecture, admits that "from the examples still remaining it may well be doubted whether the impression that such carving was almost wholly confined to the crosses, is not somewhat exaggerated." It is a rather striking admission from one so critical, and decidedly strengthens the view that there may be claimed, for Irish Romanesque, evidence of a gradual progression in the work from the ninth to the eleventh century, involving the use of ornamental stone-work.

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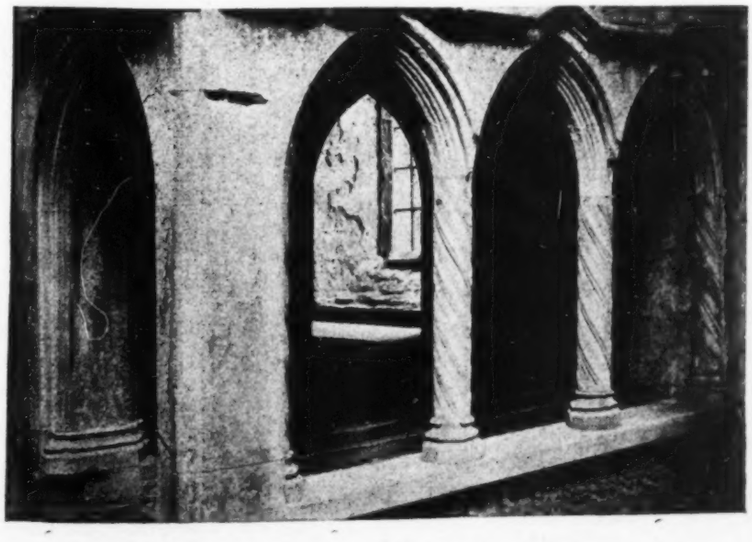

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THE BUILDING TRADE.

BUILDING MATERIAL PRICES.

IN revising our prices at the beginning of the New Year, we have again compiled table comparing these with the prices issued in our New Year's Number for 1916. It will be noticed that the prices of materials governed more or less by freights have advanced very considerably on those of 1915—which were then high. Timber has been most affected, and it is very difficult to say what the current prices for certain classes of timber really are. Stocks are getting short, and there is no saying to what heights prices will go. Metals have for some time been controlled by the Ministry of Munitions, and are only allowed to be used for works of National importance. There has also been a very considerable advance during the year in milled lead, oils, turps, &c.

	Advance Price. £ s. d.		Approximate Increase Per Cent.
BRICKS, &c.			
Stocks Bricks	0 2 0	per 1,000	5
Fletton „	0 3 0	„	10
Thames Sand	0 1 6	per yard cube	20
„ Ballast	0 1 6	„ „	20
Portland Cement		per ton (no advance)	
Blue Lias Lime	0 4 6	„	20
Grey Stone Lime	0 2 0	per yard cube	15
WOOD.			
Best Building Red—			
Deals	14 0 0	per standard	75
Battens	13 10 0	„	75
Scantlings	13 0 0	„	75
Joiners' Wood—			
White Sea First Quality Red:			
Deals, 4 in., 3 in., 2 in. by 11 in. or 9 in.	8 0 0	per standard	25
Battens, 7 in. and 8 in.	9 0 0	„	25
Archangel White:			
Best 3 in. by 11 in.	12 0 0	„	55
„ 3 in. by 9 in.	12 0 0	„	55
Prepared Floorings and Matchings—			
Second Swedish Red and Equal:			
1 in. by 7 in. Planed and Matched	1 0 0	per square	75
1¼ in. by 7 in. „ „	0 15 0	„	75
Hardwoods:			
Kauri Pine, Oak Logs, Dry Wainscot, Dry Walnut, Java Teak	Practically no change in Hardwoods.		
METALS.			
Joists, Girders, &c.—			
Rolled Steel Joists, ordinary sections, Compound Girders and Stanchions, Angles, Tees, &c., Cast-Iron Columns, &c.	Controlled.		
Iron—			
Common Bars	2 0 0	per ton	15 to 20
Staffordshire Bars, &c.	2 10 0	„	15 to 20
Mild Steel	3 10 0	„	15 to 20
Hoop Iron	5 0 0	„	15 to 20
„ „ Galvanised	5 0 0	„	15 to 20
Sheet Iron—			
Black Sheets	6 10 0	per ton	33⅓
Galvanised Sheets	7 0 0	„	33⅓
Galvanised Corrugated Sheets	4 0 0	„	33⅓
Cut Nails	9 0 0	„	33⅓
LEAD, &c.			
Sheets, Pipe Coils, &c.	7 5 0	per ton	25
Copper—			
Sheets, Nails, &c.	0 0 1	per pound	5
Oils, &c.—			
Linseed, Raw and Boiled	0 1 3	per gallon	33⅓
Turps	0 0 9	„	20
White Lead	13 0 0	per ton	33⅓
Red Lead	14 0 0	„	33⅓

THE BUILDING TRADE IN YORKSHIRE.

IT was noted last year, says the *Yorkshire Post* under date of December 27th, that the building trade had a tendency to devote its operations almost exclusively to the erection and extension of works concerned with important national products, and all that can be added after 12 months have passed is that this inclination has developed in accordance with expectations then entertained in the event of war being prolonged. Largely because of the man-power requirements of the Army and the need of directing the nation's wealth into war channels, several ambitious and, in some instances, urgent housing schemes have been held up indefinitely. A third factor of influence in this branch of the trade is the formidable cost of labour and building materials, which daunts private contractors and renders even corporate schemes uneconomic.

The figures supplied by the Leeds Building Surveyor show that 93 houses have been built during the year ending November, as against 176 in 1915, and a considerable decrease is to be observed in the estimated value of buildings shown on approved plans (exclusive of site value), which last year was £289,286, and in 1915 £445,844. The large buildings completed include six factories or works and several additions to works, as well as a canteen to a shell factory. There have also been additions to workhouses in the city, and to the General Infirmary. By way of contrast, the list comprises three picture theatres, which item is not so singular as it may appear, in view of the suggestion that they could be used as emergency military hospitals. Among the buildings in course of erection are a new ward and other extensions to the Infirmary, eight new factories or works, and 14 extensions to engineering works. There is also another picture theatre to be completed.

In the Huddersfield district the activities of builders are almost exclusively concentrated upon the construction of new and the extension of existing industrial works. The large buildings occupied by British Dyes (Limited) are a product of this energy, while there are in various parts of this area very considerable premises used in the manufacture of chemicals, and as engineering and motor-wagon construction works. The housing problem, although urgent, has had perforce to stand aside for the time being. Business done in Hull is represented by an extensive drapery stores and a Council school. Several ambitious schemes are "in the offing," so to speak, awaiting the tide of peace. Extensions to munition works and the building of a large engineering shop in one district have engaged the attention of the trade in Halifax. Fewer houses have been built as compared with previous years, although there is no lack of prospective tenants. Inquiries in Sheffield show that so far as the private house property and similar undertakings are concerned, that branch of the trade has practically ceased to be. Every ounce of energy that the building trade could muster was devoted to munitions, to the extension of works and the erection of houses and hutments for the accommodation of the thousands of new munition workers. The completion of sections of hospital extensions have continued. Employers naturally do not relish the stopping of ordinary contracts, but it is understood that some very profitable business has been done in the other sphere.

Statistics supplied by the City Engineer and Surveyor (Mr. W. H. S. Dawson) show that there has been very little building in Bradford during the past year. The number of plans deposited during the year ended August 31 was 485, as compared with 597 in the year preceding, and the number of plans approved 385, as against 465.

PROPOSED NEW BUILDINGS AND OTHER WORKS.*

IN these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works, at the time of publication, have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; L.G.B. for Local Government Board; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.

ABERDEEN.—The Plans Committee of the T.C. has approved of the following plans: Garage, coal store, &c., at No. 75, Brighton-place, for Mr. John D. Bisset, per Messrs. D. & J. R. M'Millan, architects; enclosure for electric hoist, Langstane-place, for Campbells, Ltd., per Messrs. Jenkins & Marr, architects; coppersmith's shop and store at North Esplanade East, for John Lewis & Sons, Ltd., per Messrs. Sutherland & George, architects.

ABERTILLERY.—Among the public works postponed until after the war is a new school to be erected on the Sofrydd Estate, at Crumlin. A special housing scheme and a scheme for railless traction (sanctioned by Parliament) also stand in abeyance. There is the big scheme of the Abertillery and District Water Board for a supply of water from the Grwyne Fawr; and also the Abertillery Cottage Hospital scheme, and the sinking of new shafts at Aberbeeg.

ASHFORD, (KENT).—A plan for a house for Mr. H. Knock in Jemmett-road has been approved.

BEDWAS.—The Bedwas and Machen U.D.C. seek powers to borrow £800 for purchasing lands on which to construct buildings for omnibuses.

BIRMINGHAM.—The City Council have under consideration the subject of providing additional accommodation for the treatment of tuberculosis.

BOLTON.—Plans passed by the T.C.: Extension over offices, Blackhorse-street, for Messrs. H. Bessemer & Co.; extensions, Foundry-street, for Chatwood Safe Co.; motor shed and pump-houses, Handel-street, for Falcon Spinning Co.; motor shed, Sunnyside Mill, Daubhill, for Messrs. Tootal, Broadhurst & Lee Co., Ltd.; petrol store, &c., Shaw-street, for Victoria Wringing Machine Co.; workshop, Angelo-street, for Mr. R. Wood; seven w.c.'s and back yards, 48 & 60, Old-street, Sharples, for Mr. W. Knowles; offices and boundary wall, Romer-street, for Mr. J. Haslam.

BOURNEMOUTH.—Plans passed by T.C.:—Additions Bridge House, Cleveland-road, for Mr. A. Gould; alterations, La Maison, corner of Charminster and Heron Court-roads, for Mrs. Rolf Davidson; motor-house, store, &c., Montrose, Portman-crescent, for Mr. F. W. Riley; covered yard, 112, Poole-road, for Messrs. Parsons & Sons; additions, Charminster-road for Mrs. Pettey.

BRIGHOUSE.—Plans passed by T.C.:—Fitting shop, Woodhouse Works, for Messrs. J. Blakeborough & Sons; pump and tank house, Woodvale Mills, for Ormerod Bros., Ltd.

BUDLEIGH SALTERTON.—The U.C. has approved plans for the erection of an electric power house at the back of "Rosemullion."

CARDIFF.—Works after the war: Duke-street widening scheme, estimated cost, about £132,500; Government buildings, Cathays Park; widening of the Feeder Bridge, in Bridge-street, at a cost of about £1,000.

DERBY.—The Guardians have been requested by the L.G.B. to proceed with the preparation of the plans and estimates for the proposed new infirmary in order that the matter might be so advanced that approval could readily be given when the circumstances permitted.

DUDLEY.—Plans passed by T.C.:—New workshop, Cradley-road, Netherton, for Messrs. J. Barnsley & Sons; motor garage, Hall-street, for Messrs. A. Harper, Sons & Bean, Ltd.; scullery, "Green Man," Castle-street, for Messrs. Ind, Coope & Co., Ltd.; rolling way, "Junction Inn," Cromwell-street, Kates Hill, for Messrs. J. Hanson & Sons, Ltd. The question of a housing scheme for Netherton has been referred to the Housing Special Sub-Committee for consideration and report.

EXETER.—The Sanitary Committee has presented to the City Council a revised plan of a small-pox hospital, including a six-bed block, administrative block and other buildings, which is estimated to cost £3,729.

GLASGOW.—The Special Committee on Erection of Dwelling-houses in the City recommend approval of a report proposing that it be remitted to the committee to select on ground belonging to the Corporation a site or sites suitable for the erection of dwelling-houses and to prepare plans of the houses proposed, reserving for determination later the borrowing powers to be exercised and the time when the erection of the houses is to be proceeded with.

GRANTON.—It is proposed to erect a rest hut for seamen at Granton.

HACKNEY.—Construction of lavatory accommodation for London County Council's store premises, 19, Portland-avenue; drainage works at Sherry's timber wharf and mills, Lee Navigation Cut, for Messrs. J. Hamilton & Sons.

HAMMERSMITH.—Plans passed by B.C.: Additional drainage to works of Waring & Gillow, Cambridge road; drainage, Upper Mall, Kelmsworth House, for Pilditch, Chadwick & Co.; drainage, 45, Goldhawk road, for G. J. Wodehouse; relaying of drains, 19 Havelock-road, for W. Cassford.

HAMPSTEAD.—The B.C. has approved of an amended scheme for rebuilding Kilburn Priory Bridge, in connection with the widening of the London and North-Western Railway.

HOVE.—Plans passed by T.C.:—Ice store, Holland-road, Mr. E. Carter, for the Lightfoot Refrigeration Co.; fire escape facilities, 39, Brunswick-square, Mr. A. H. Lainson, for Mr. H. B. Atkinson; factory, Hove Park-villas, Messrs. Clayton & Black, for the Standard Tablet Co. It is proposed that Messrs. Carwardines, Ltd., be required to erect an additional outside staircase at their factory in Mortimer-road.

HULL.—Plans passed by T.C.:—H. Vokes, twelve houses, Southcoates-avenue; G. Hunters, Ltd., drainage and w.c.'s, Oxford-street; E. E. Keighley & Co., w.c. and lobby, Wincolmlee; Thornton Varley & Co., extension of premises, North-street; G. Jackson & Sons, additions, 36, Witham; W. Pearsons, Ltd., shed, Clough-road; Hull Oil Manufacturing Co., pig-styes, Stoneferry; S. G. Healey, alterations, 251, Anlaby-road; British Oil and Cake Mills, Ltd., w.c.'s, Glass House-row; Hull Brewery Co., Ltd., store, 16, Sculcoates-lane; G. Clark & Sons, workshop, Myton-street and Trundle-street; Reckitt & Sons, Ltd., addition to shed, Dansom-lane; Young People's Institute, additions, Charlotte-street; Hargreaves Bros. & Co., Ltd., temporary building, Gipsyville; Francis Reckitt Institute, covered way, Dansom-lane; C. D. Holmes & Co., Ltd., additions, English-street.

LEEDS.—It is proposed by the Corporation to adapt Farfield House, Armley, as a training home for mentally defective women, at an estimated cost of £211, for alterations and additions; and of £113 for the provision of a laundry.

LINCOLN.—The City Council are considering the question of the erection of houses for the working classes, and the provision of housing accommodation for the munition workers. Replying to Mr. Stephenson, the Town Clerk said there had been no communication from the Local Government Board since the last meeting.

LONDON.—The Licensing Justices have granted an application, with plans, for leave to alter the Old Queen's Head, Oxford-street.

MAESTEG.—Maesteg Council is considering the question of adopting a scheme of housing and town-planning.

MAIDSTONE.—Plans have been submitted to the T.C. for the extension of the works of Tilling-Stevens, Ltd.

MANCHESTER.—The Parks Committee of the Corporation has sanctioned a scheme for erecting workshops for the benefit of the convalescent soldiers in Heaton Park.

MANSFIELD WOODHOUSE.—The U.D.C. has approved plans for thirteen houses near Old Mill-lane for Mr. E. Stainforth.

MID-GLAMORGAN.—Amongst the schemes which the Ogmore and Garw Council have in view are the construction of a new road from Brynmenyn to Pandy, the improvement of the sewerage works at Brynmenyn, a scheme of housing, and a road-bridge across the valley at Gilfach Goch. The total cost of this work would be about £43,000.

NEWPORT (MON.).—Probable works after the war:—Reconstruction of Newport Bridge, estimated cost, £150,000. Proposals for stone, steel, and ferro-concrete bridges have been submitted to the Corporation for consideration. There is also the question of Town Hall extension and new Assize Courts, the Somerton Housing Scheme, the Corporation-road sewer scheme, the widening of Chepstow-road, town-planning scheme, and the provision of a new reservoir. The Corporation Water Works Committee have inspected a site in the Caerfanell Valley, near Talybont, with a view of constructing a reservoir there.

NEWTON-IN-MAKERFIELD.—The U.D.C. has passed plans submitted by the Surveyor for the conversion of the offices of the old gas-works into a dwelling-house.

NEWBURY.—The Corporation has approved the plan of the proposed new wash-house, drying and ironing room at the Isolation Hospital, to be erected at a cost of £50, and accepted A. J. Chivers' estimate for the erection of the same for that sum.

ORMSKIRK.—The Council has approved a plan of proposed addition to works for Messrs. C. M. Hesford & Co., of Moorgate.

OSSETT.—Plans passed:—Cart-shed, Little Town End, for Messrs. Geo. Bennett & Sons; cart-shed, Broadowler-lane, for Mr. A. Cobb.

PENYBONT.—The principal schemes which the Penybont R.D.C. postponed at the outbreak of the war were a sewerage scheme for Pencoed and the widening of the road at Southerndown, and the Council are now awaiting a favourable opportunity for putting the work through.

PLYMOUTH.—Plans passed by the T.C.:—Addition to Townsend House, Tavistock-road, for T. Hoyle; alterations at 28, Tavistock-road, Stoke, for Plymouth Co-operative Society, Ltd.; alterations to Lyric Cinematograph Theatre, Union-street, for Race & Lowe; alterations to 2, Marlborough-street, for M. Fredman; alterations to 3, Lambert-street, for E. Goldman; Cinematograph Theatre, corner of St. Levan-road and Ford-hill, for F. J. Stanbury; alterations to 101, Union-street, for Young Men's Christian Association. Plans are before the Council for two dwelling-houses, Kent-road, for T. W. Box; and six dwelling-houses, Wolseley-road, and two dwelling-houses, Auckland-road, for J. Henwood.

PORTSMOUTH.—Plans passed by T.C.:—Four houses, Edgeware-road, for Mr. A. Taylor; garage, St. Albans-road, for Messrs. Geo. Park & Co.

PORT-GLASGOW.—Ground has been acquired at Fyfe Park for the erection of new gas-works, but this scheme cannot be carried through until after the war. The Council have presented a Provisional Order to the House of Commons for the purpose of augmenting the existing water-supply.

PRESTON.—Plans passed by T.C.:—Additions, 70, Lovat-road, Mr. J. Milner, for executors of Wm. Walmsley; shed, Market-street, Mr. J. Miller, for Preston and District Farmers' Trading Society; conveniences, Moor Park Hospital, for Mr. F. Mallott.

RETFORD.—The T.C. has passed a plan for motor-house, Welham-road, for Mr. T. Hopkinson, jun.

ROTHERHAM.—The Improvement of Property Committee of the B.C. recommend the formation of a sub-committee, with power to co-opt representatives of the various industries and societies of the district, to consider and report upon a scheme for the development of the town (including the preparation of a schedule of sites available for works, &c.). The Housing Committee have recommended adherence to the proposed purchase of land near the Aldwarke pumping-station as a site for working-class dwellings.

SHEFFIELD.—Plans passed by T.C.:—Addition, Forncett-street, for Messrs. H. Rossell & Co., Ltd.; workshop additions, Effingham-road, for Messrs. George Cooper & Sons, Ltd.; additions, Heat Treatment Dept., Old Hall-road, for Messrs. Brown Bayleys Steel Works, Ltd.; steel cutting shop, Coleridge-road, for Messrs. Brown Bayleys Steel Works, Ltd.; ropery extension, Sheffield-road, for Messrs. Wm. Cooke & Co., Ltd.; alterations, West-street, for the Co-operative Wholesale Society; additions, Attercliffe-road, for Messrs. G. Oxley & Sons, Ltd.; additions, Hodgson-street and Henry-lane, for Messrs. E. H. Hill, Ltd.; electric shop additions, Vulcan-road, for Messrs. Hadfields, Ltd.; mess-room additions and alterations, Hereford-street, for Messrs. G. & J. Hall; steel warehouse addition, Faraday-road, for Sir Jos. Jonas, Colver & Co., Ltd.; cooling tank addition, Washford-road, for the Effingham Steel Works, Ltd.; steel warehouse addition, Rockingham-street, for Messrs. J. A. Pearce & Co.; workshop additions, John-street, for Mr. Hy. Stones; additions and alterations, Oakdale-road, for Mr. G. S. Marple; furnace building additions, Stevenson-road, for Sir Jos. Jonas, Colver & Co., Ltd.; timber drying shed, Broadfield-road, for Messrs. C. E. Richardson & Co., Ltd.; additions, Stevenson-road, for Messrs. Marple & Gillott, Ltd.; additions, Forncett-street, for Messrs. H. Rossell & Co., Ltd.; addition, Alsop-lane, for Messrs. D. Gilmour & Co., Ltd.; additions, Millhouses-lane, for Mr. H. C. Sayer; machine shop and forge additions, Carlisle-street East, for Messrs. Cammell, Laird & Co., Ltd.; office additions, Penistone-road, for Messrs. D. Doncaster & Sons, Ltd.; garage addition, Royda Mill-street, for Messrs. Wellerman Bros.; additions and alterations, Corporation-street and Water-lane, for Messrs. Mellowes & Co., Ltd.; alterations, Ouse-road, for Messrs. C. & J. Hampton, Ltd.; addition, Langsett-road and Whitehouse-lane, for Mr G. J. Crapper; motor store, Shude-lane, for Sheffield Corporation; warehouse addition, Brightside-lane, for Messrs. Griffith Bros., Ltd.; lavatory addition, Warren-street and Leveson-street, for the Tempered Spring Co., Ltd.; stores additions, Weedon-street, for Messrs. T. Firth & Sons, Ltd.; w.c.'s and coal house, Royal Hotel, Abbeydale-road and London-road, for Messrs. Truswells Brewery Co., Ltd.; additions and alterations, Mary-street, for Messrs. Boswell, Hatfield & Co., Ltd.; time office addition, Sheffield-road, for the British Abrasive Wheel Co., Ltd.; purifier house addition, Savile-street East, for the British Oxygen Co., Ltd.; additions, Mowbray-street, for Messrs. J. Bedford & Sons, Ltd.; steel warehouse addition, Vulcan-road, for Messrs. T. Firth & Sons, Ltd.; store shed, Greystock-street and Princess-street, for Messrs. T. Firth & Sons, Ltd.; lorry shed, Worksop-road, for Messrs. Brown Bayleys Steel Works, Ltd.; additions, Millhouses-lane, for Mr. J. A. Pearce; stable, Sheffield-road, for the Sheffield Simplex Motor Works, Ltd.; electric furnace additions, Mowbray-street and Ball-street, for Messrs. J. Bedford & Sons, Ltd.; additions, Egerton-street, for Messrs. Carr, Wild & Co., Ltd.; messroom and lavatory, Carlisle-street East, for Messrs. John Brown & Co., Ltd.; bakehouse, Ecclesall-road, for Mr. S. Borwick; stores office, Vulcan-road, for Messrs. Hadfields, Ltd.; plating shop addition, Coleridge-road and Century-street, for Messrs. E. Dubied & Co.; additions and alterations, Princess-street and Savile-street, for Messrs. T. Firth & Sons, Ltd.; additions, 12, Bamforth-street, for Mr. O. Bingham. The Estates Committee has had under consideration new housing schemes. As a result, the E.C. has been notified to relinquish the tenancy of the school playing fields at High Storrs, and the Water Committee is to be asked to transfer to them the Rivelin Valley estate, or part thereof, for development by the erection of working-class dwellings.

ST. MARYLEBONE.—The B.C. has made an order for the combined drainage of 45 and 46, Exeter-street and Welcome-place according to the plans submitted by Mr. E. C. Tepplin for Viscount Portman.

SKEWEN.—It is reported that the Anglo-Persian Oil Co. has acquired an area of land between Skewen and Jersey Marine for laying down new works. The works will consist of oil refineries, &c., and the capital expenditure on the undertaking will amount to about £500,000.

SUNDERLAND.—A meeting was held at Sunderland recently to consider a proposal by the War Office that the town provide a war hospital for sick and wounded soldiers. The scheme is to cost £30,000.

TUNBRIDGE WELLS.—A plan and estimate for fitting up premises in Grosvenor-road as a ladies' sanitary convenience has been referred for consideration.

WOLVERHAMPTON.—Plans passed by the B.C.:—J. Horton, w.c.'s, lavatories, &c., Star and Garter Hotel; Johnson Bros., staircase and w.c., 1 and 1½, Darlington-street; K. Gatis, w.c. and office, Vane-street; F. Griffiths & Co., chimney stack, Gospel Oak Inn, Eagle-street; F. W. Male, motor house, wash house &c., Penn-road; Mrs. Day, kitchen, Hunter-street; A. E. Sutton & Co., shed, Eagle-street; Accuracy Works, Ltd., mess room, Cousins-street; J. Gibbons, iron shed, St. John's Works; C. Jones, shed, 34, Sherwood-street; S. Bridgen, stables and storeroom, Sidney-street.

WORCESTER.—The Mayor of Worcester has inaugurated a scheme for building houses for totally disabled Worcestershire soldiers and sailors, and he has given a site in the city for the purpose.

* See also our List of Competitions, Contracts, &c., on page 46.

RATES OF WAGES IN THE BUILDING TRADE.

THE following are the present rates of wages in the Building Trade in the principal towns of England and Wales. It must be understood that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur :—

—	Masons.	Brick-layers.	Car-penters, Joiners.	Plas-terers.	Slaters.	Plum-bers.	Painters.	Masons' La-bourers.	Brick-layers' La-bourers.	Plas-terers' La bourers
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Aberdare	9½	9½	9½	9½	9½	9	8	6½	6½	6½
Accrington	10	10	10	9½	9	10	9½	6½	6½	6½
Altrincham	9½	10½	11	10	8½	9½	11½	7½	7½	7½
Ashton-under-Lyne	11	11	11½	10½	9½	11	10	7½	7½	8
Barnsley	10	10	9½	9½	9	9½	8½	7½	7½	7½
Barrow-in-Furness	10½	11	10½	10½	10½	10½	10½	8	8	8
Barry	9½	9½	9½	10	—	9	8½	6½	6½	6½
Bath	9	9	9	8½	8½	9	8	6½	6½	6½
Bedford	8	8	9	8½	8	9	8	5½	5½	6
Birkenhead	1/-	1/-	1/-	1/-	1/-	1/-	11	8	8	8
Birmingham	11½§	11½§	11½§	11½§	11½§	11½§	10½§	8½§	8½§	8½§
Bishop Auckland	9	9	10	9½	11	9	8	6½	6½	7½
Blackburn	10½	10½	11½	10	10½	11	9½	7½	8	8
Blackpool	11	9½	9½	9½	9½	10	9½	6	6	6
Bolton	10½	11	1/-	10½	8½	9½	9½	6–7	7	7½
Bournemouth	8½	9	9	9	8½	10	9½	6½	6½	6
Bradford	10½†	10½†	10†	10½†	10†	10†	9½†	8½†	8½†	8½†
Bridgwater	6½	6½	6½	6½	6½	6½	6	4	4	4
Brighton	9½	9½	9½	9½	—	9½	8	7	7	7
Bristol	11	11	11	11	—	11	10	8½	8½	8½
Burnley	10½	10½	10½	9½	8½	9½	9½	7	7½	7½
Burton-on-Trent	9½	9½	9½	10	9	9½	8½	7	7½	7½
Bury	11	11	11½	9½	9½	10	10	7½	7½	7½
Cambridge	9½	9	9	9½	9½	10½	10	7½	7½	7½
Cardiff	10½	10½	10	10½	10½	10½	10	7½	7½	7½
Chatham	8½	10	10	9½	—	10½	9½	6	6	6
Chelmsford	8	7½	8½	9	—	7½	6½	7	7½	7½
Cheltenham	9½	9½	9½	9½	—	9½	8½	7	7	7
Chester	9½	10½	11	9½	9½	9½	9½	6½•	6½•	6½•
Chesterfield	9	9½	9	9½	9½	10½	9½	6½	7	6½
Colchester	8	8½	8½	9	8	9	8½	5½	5½	5½
Coventry	11	11	11	10½	11	9	8	5½	5½	5½
Crewe	7½	8	7½	9	8½	11	10	5½	5½	5½
Darlington	9½	10	10½	10½	10	9½	8	5½	5½	6
Derby	9½	10	9½	9	9	9½	8	7	7	7
Doncaster	9½	9½	9½	9½	9½	9	8	6½	6½	7
Dudley	9½	10	10	10	10	9½	8½	6½	6½	7
Durham	9½	9½	9½	9½	10	9	8	6½	6½	7
East Glam. and Mon. Valleys	10	10	10	10	—	9	7	7	7	7
Exeter	9½	9½	9½	9½	9½	9	8½	7	8	8
Folkestone	8½	9	9	9½	8½	9	8	7	7	7
Gloucester	8	9½	9½	8½	9	9½	8	7	7	7
Grantham	8	8	7½	7½–8	7½–8	—	—	—	—	—
Grays	—	11	11	—	—	11	9	6½	6½	7
Grimsby	9	8	8	9½	—	9	8	5	5	5
Great Yarmouth	8	8	8½	—	9	9	8½	6½	6½	6½
Halifax	10	10	9½•	9	9	8	6½	5	5	5
Harrogate	10½	9½	10	9	8	9	8½	7½	7½	7½
Hartlepools	10½	11	11	11	11	10½	9	8	8	8
Hastings	8½	8	8	8½	8	8	7	6½	5½	5½
Hereford	8	8	7½	8½	8	7	7	5½	5½	5½
Huddersfield	11	11	10½	9½	10	9	8	7½	7½	7½
Hull	11	10½	10½	10½	10½	9	8½	8½	8½	8½
Ipswich	8½	9	9	9	9	9½	7½	6	6	6
Lancaster	10½	10	10	10	10	10	9	6½	6½	6½
Leamington Spa	9	9½	9½	8½	9	9½	8½	6	6	6
Leeds	10½	10½	10½	10½	10½	11	9	6½	6½	6½
Leicester	10½	10½	10½	10½	11	10½	9	8	8	8
Lincoln	9	9½	9½	10	8½	8½	8	6	6	6
Liverpool	1/-	1/-	1/-	11½	11½	1/-	10½	8	8	8
Llanelly	9½	9½	9½	8½	9	8½	8	5½	5½	5½
London	10½	10½	1/0½	1/0½	—	1/1	10	7½	8	8
Loughborough	9	8½	9½	9	9	9	8½	5½	5½	5½
Luton	9½	9	9½	8½	9	9	8½	7	7	7
Maidstone	9	9	9	9	9	9	8½	6½	6½	6½
Manchester	11	1/-	1/-	1/-	9	9	8½	6½	6½	6½
Mansfield	8½	10	9½	8½	9	10	9	6½	6	6
Merthyr Tydfil	9½	9½	9½	9½	—	9½	9	7½	7½	7½
Middlesbrough	10½	11	11	11	9½	11	10½	6½	7	7
Newcastle-on-Tyne	11½	11½	11½	11	11	10½	9	6½	6½	6½
Newport, Mon.	10	10	10	10	10½	10	9	8	8	8
Northampton	10	10	10	10	10	10	9½	7½	8	8
Norwich	8½	8½	8½	8½	8	8½	7½	6	7	7
Nottingham	1/-	1/-	1/-	11½	11½	1/-	10	8	8	8
Oldham	11	11	1/-	10	10	10‖	9½	7½	7½	7½
Oxford	9½	9	9	9	8	9	8½	6½	6½	6½
Plymouth	9•	9•	9•	9•	9•	9•	8½	6½	7	7
Pontypridd	9½	9½	9½	9½	9½	9½	9	7½	7½	7½
Portsmouth	10½	10½	10½	10½	10½	10½	9½	7½	7½	7½
Preston	10½	10½	9½	10½	10½	9½	8½	7•	7•	7•
Reading	9	10½	10½	10½	10½	9½	9	6½	6½	6½
Rochdale	10½	9½	9½	10½	—	11	10½	8	8	8
Rochester	8	10½	11½	10	9½	9½	8½	6½•	6½•	6½•
Rugby	10	10	10	9	9	10	9½	7½	7½	7½
St. Albans	9	9	9	10½	11	10	9	7	7	7
St. Helens	9	9½†	10†	9–10	9	9–10	8	7	7	8
Scarborough	9	9½	9	9½	9½	9½	8	7	7	7
Sheffield	10½	10†	10½†	9½	8½	9	8	7	7	7
Shrewsbury	8½	9½	9½	9½	8	10½	8	6½	6	6
Southampton	10½	10½	10½	10½	—	11	9	7	7	7
Southend-on-Sea	• 9	9	9	10	10½	8½	7	6½	7½	7½
Southport	11	10	10½	10	P'cework	10½	9	7½	6½	6½
South Shields	11½	11½	11½	10	10	10	10	7½	7½	7½
Stockport	11	10½	10½	11½	11	10½	10	7	6	6
Stockton-on-Tees	10½	11	11	10½	10½	10	10½•	7	7½	7½
Stoke-on-Trent	10	10½	10	11	11	10½	9½	7	8	8
Stroud	8	8	8	8	7½	9½	9	7	7½	7½
Sunderland	11	11½	11½	11	11	9½	7½	6	8	8
Swansea	10½	10½	10½	10½	10½	9½	9½	8	8	8
Taunton	8	8	8	8	—	9	8	7	8	8
Torquay	8	8	8	8	8	8	8	7	7	7
Wakefield	10	10	9•	9½	8½	9	8	7½	7½	7½
Walsall	10½	10	10	10	9½	9	9	7½	7½	7½
Warrington	8½	10½	10½	10½	9½	10	8½	7½	7½	7½
West Bromwich	11	11	10½	10½	8½	10½	9½	6½	6½	6½
Wigan	10½	11	10½	10	—	10	9	8	8	8
Windsor	9	9	9	10	9½	10½	9½	7	8	8
Wolverhampton	10½	10½	10½	11	8	10	9	6	6	6
Worcester	9	9½	9½	9½	9½	9½	8½	7½	7½	7½
York	9½	9½	9½	9½	10	9½	8½	6½	7	6½

The Masons' rate given is for bankers; fixers usually ½d. per hour extra.

• War bonus of 2s. per week granted. † War bonus of 3s. per week granted. ‡ War bonus of 2s. 6d. per week granted.
‖ War bonus of 6s. per week granted. § 1d. per hour extra for men engaged on munition work

Competitions, Contracts, &c.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

BUILDING AND PAINTING.

✱FEBRUARY 1.—**London.**—PAINTING, &c.—The Guardians of Southwark Union invite tenders for painting, cleaning, &c., to the laundry and engine-house at the Newington Institution, Westmoreland-road, S.E. Specification, &c., of the Guardians' Architect, Mr. Saxon Snell, F.R.I.B.A., No. 9, Bentinck-street, Manchester-square, W. Deposit, £5.

FURNITURE, MATERIALS, etc.

JANUARY 12.—**Swansea.**—FURNITURE.—The Corporation invite tenders for the furnishing of the Borough Hospital, Cwmllwyd, situate near Waunarlwydd. Specifications of Dr. Thomas Evans, Medical Officer of Health, 5, Prospect-place, Swansea.

✱JANUARY 24.—**London.**—MATERIALS, &c.—Supply to the Chelsea B.C. of builder's materials, &c. Forms from Mr. T. W. E. Higgens, Borough Surveyor, Town Hall.

JANUARY 24.—**London.**—BUILDER'S MATERIALS.—Supply to the Battersea B.C. of builders' materials. Forms, &c., of Mr. W. Marcus Wilkins, Town Clerk, Town Hall, Battersea, S.W.

FEBRUARY 1.—**Middlesbrough.**—MATERIALS.—Supply to the Corporation of builders' materials required from April 1, 1917, to March 31, 1918. Specification, &c., of Mr. S. E. Burgess, M.Inst.C.E., Borough Engineer Middlesbrough.

ENGINEERING, IRON AND STEEL.

JANUARY 12.—**Manchester.**—IRON, &c.—Supply to the directors of the Manchester Ship Canal Company of iron, steel, &c. Specifications at the Stores Department, Manchester Docks, Trafford-road, Salford.

JANUARY 13.—**Bristol.**—BOILER.—For providing and delivering a hot-water boiler at the Stapleton Institution for the B.G. Specification, &c., of Mr. J. J. Simpson, Clerk to the Guardians, St. Peter's Hospital.

JANUARY 22.—**Halifax.**—BENZOL RECOVERY PLANT.—The Gas Committee invite tenders for the supply and erection of 65 per cent. crude benzol recovery plant, at their Mulcture Hall Road Works, Halifax. Particulars from the Engineer.

JANUARY 24.—**Dartford.**—STEAM TRACTOR, &c.—The Metropolitan Asylums Board invite tenders for the supply to Joyce Green Hospital, Dartford, Kent, of one 5-ton steam tractor and four 6-ton trailers. Specification by Mr. T. Cooper, M.Inst.C.E., Acting-Engineer-in-Chief. Form of tender, &c., may be inspected at the office of the Board, Embankment, E.C., and can be obtained upon payment of £1 deposit.

MARCH 5.—**Melbourne.**—TURBO ALTERNATOR.—Supply of one 7,500 K.V.A. turbo alternator and condensing plant. Form, &c., of Messrs. McIlwraith, McEacharn & Co. Ppty., Ltd., Billiter-square-buildings, London, E.C. Deposit, £1 1s.

ROAD, SANITARY, AND WATER WORKS.

JANUARY 16.—**Lancing.**—SEA DEFENCES.—The East Lancing Sea Defence Commissioners invite schedule of prices for the erection of a timber barrier and a timber wave screen, each about 1,000 ft. in length, on the sea frontage at Lancing. Drawing, &c., can be seen, and schedule of quantities obtained at the Offices of Messrs. R. B. Grantham & Son, Civil Engineers, 5, Little College-street, Westminster Abbey, London, S.W., deposit £3 3s.

JANUARY 17.—**Llantrisant.**—ROAD IMPROVEMENT.—The Glamorgan C.C. invite tenders for an improvement of the Llandaff and Llantrisant main road at South Gate, Llantrisant. Plans, &c., at the Police Station, and of Mr. T. Mansel Franklen, Clerk of the County Council, Glamorgan County Hall, Cardiff.

JANUARY 17.—**Reigate.**—TARVIA, &c.—Supply to the T.C. of the following materials required for tarring purposes :—Tarvia, in barrels; Dehydrated tar; grit, and granite chippings. Forms, &c., of Mr. Fred. T. Clayton, Borough Surveyor, Municipal Buildings, Reigate.

JANUARY 19.—**Manchester.**—DRAINAGE WORK.—The Corporation invite tenders for the execution of general contractors' and plumbers' work in connection with the drainage of houses and other premises, for a period of twelve months, ending March 31, 1918. Forms, &c., of the Superintendent of the Sanitary Department, Drainage Branch, Civic Buildings, Mount-street, Manchester. Deposit, £1 1s.

JANUARY 20.—**Norwich.**—ROAD MATERIALS, &c.—The Norfolk C.C. invite tenders for materials, team labour, tools, implements, &c. Specifications, &c., of Mr. W. W. Gladwell, M.Inst.M. and C.E., County Surveyor, The Shirehouse, Norwich.

JANUARY 22.—**Sleaford.**—GRANITE AND SLAG.—Supply to the R.D.C. of granite and slag for roads and gravel for paths, for the year ending 28th February, 1918. Specifications, &c., of Mr. Ernest H. Godson, Clerk to Rural District Council, 27, Northgate, Sleaford.

JANUARY 24.—**Dorchester.**—GRANITE, &c.—Supply to the Dorset C.C. of granite, basalt, limestone and tar-macadam. Forms from Mr. E. H. Habgood, Acting County Surveyor, County Offices, Dorchester.

Auction Sale.

✱JAN. 24, ETC.—**Shoreditch.**—Messrs. J. T. Skelding & Co. will sell by auction at 56-59, High-street, Shoreditch, N.E., the stock of a marble merchant.

Those with an asterisk (✱) are advertised in this issue.

PRICES CURRENT OF MATERIALS.

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry. Since our last issue oils have been reduced. Slates and metals have been revised.—Ed.]

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.
Per 1000 Alongside, in River Thames.	
Best Stocks	2 2 0
Picked Stocks for Facings	2 14 0
Per 1000, Delivered at Railway Depot, London.	
Flettons	1 13 0
Best Fareham Red	3 12 0
Best Red Pressed Ruabon Facing	5 5 0
Best Blue Pressed Staffordshire	5 7 0
Do. Bullnose	5 12 0
Best Stourbridge Fire Bricks	7 0 0
GLAZED BRICKS—	
Best White, Ivory, and Salt Glazed Stretchers	13 7 6
Headers	12 17 6
Quoins, Bullnose and 4½in. Flats	16 17 6
D'ble Str'tch'rs	18 17 6
D'ble Headers	15 17 6
One Side and two Ends	19 17 6
Two Sides and one End	20 17 6
Splays and Squints	18 7 6
Second Quality, £1 per 1,000 less than best.	
	s. d.
Thames Ballast	8 3 per yard, delivered.
Thames and Pit Sand	9 6 „ „ „
Best Washed Sand	10 0 „ „ „
½ in. Shingle for Ferro-Concrete	8 6 „ „ „
Per ton, delivered.	
	£ s. d.
Best Portland Cement	2 5 0 .. 2 8 0
Do. £2 1s. alongside in 80-ton lots.	
Ferrocrete 2s. 6d. per ton extra on above.	
Best Ground Blue Lias Lime	1 5 6 at rly. depot.

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 10s. 0d. per yard delivered.
Stourbridge Fireclay in s'cks 35s. 0d. per ton at rly. dpt

STONE.

	s. d.
BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R., per ft. cube	1 7
Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R., per ft. cube	1 8½
Do. do. delivered on road waggons at Nine Elms Depôt	1 9½
PORTLAND STONE—	
Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Westbourne Park, G.W.R., South Lambeth, G.W.R., or Nine Elms, or L. & S.W.R., per ft. cube	2 5½
Do. do. delivered on road waggons at Pimlico Wharf or Nine Elms Depôt, per ft. cube	2 6½
White basebed, 2d. per ft. cube extra.	

RANDOM BLOCKS—Per Ft. Cube, delivered at Rly. Dpôt.	s. d.		s. d.
Ancaster in blocks	2 0	Closeburn Red	
Beer in blocks	1 7½	Freestone	2 2
Grinshill in blocks	2 4	Red & White Mansfield random block	2 9
Darley Dale in blocks	2 5	Yellow Magnesian Limestone do. do.	3 3

YORK STONE—*Robin Hood Quality.*

Per Ft. Cube, Delivered at Railway Depôt.	s. d.
Scappled random blocks	3 4
Per Ft. Super. Delivered at Railway Depôt.	
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 5
6 in. rubbed two sides, ditto	2 8
3 in. sawn two sides slabs (random sizes)	1 0½
2 in. to 2½ in. sawn one side slabs (random sizes)	0 8½
1½ in. to 2 in. ditto, ditto	0 6½

HARD YORK—

Per Ft. Cube, Delivered at Railway Depôt.	
Scappled random blocks	3 0
Per Ft. Super., Delivered at Railway Depôt.	
6 in. sawn two sides landing to sizes (under 40ft. super.)	2 3
6 in. rubbed two sides ditto	2 7
3 in. sawn two sides slabs (random sizes)	1 0
2 in. self-faced random flags	0 5

TILES.

	Per 1,000 f.o.r. London. £ s. d.
Best machine-made tiles or hand-made sand-faced tiles from either Broseley or Staffordshire district	2 12 6
Ornamental ditto	2 15 0
Hip and valley tiles (per dozen)	0 5 6

SLATES.

	Per 1,000 of 1,200 f.o.r. London. £ s. d.
Best Blue Bangor Slates, 20 by 10	13 5 0
First quality „ „	12 15 0
„ „ 16 by 8	6 10 0
Best Blue Portmadoc, 20 by 10	13 5 0
First quality „ „	12 12 6
„ 16 by 8	6 7 6

WOOD.

BEST BUILDING REDWOOD. Imported sizes.	Nominal. Per standard. £ s. d.	£ s. d.
Deals: 4 in. by 12 in., 4 in. by 11 in., 3 in. by 11 in., 4 in. by 9 in., and 2 in. by 11 in.	36 0 0 ..	38 0 0
9 in. by 9 in., 2½ in. by 9 in., and 2 in. by 9 in.	35 0 0 ..	37 0 0

WOOD (*Continued*).

BEST BUILDING REDWOOD.	Per standard. £ s. d. .. £ s. d.
Battens: 2 in., 2½ in., and 3 in. by 8 in. ... 2 in., 2½ in., and 3 in. by 7 in. ... 2 in., 2½ in., and 3 in. by 6 in.	33 0 0 .. 35 0 0
Scantlings: 2 in. by 3 in., 2 in. by 3½ in., 2 in. by 4 in., 2 in. by 4½ in. .. 3 in. by 4 in., and 3 in. by 4½ in.	
Boards: 1 in., 1¼ in., and 1½ in. by 6 in. and 7 in.	0 10 0 } more than
¾ in.	1 0 0 } battens.
Seconds	1 0 0 less than best
Best Middling Dantzic and Memel Fir Timber Logs (average specification)	Per load of 50 ft. cube. 14 0 0 .. —
Stocks very limited.	
Sawn pitch pine logs (about 35 cu. ft. average)	Per load. 14 0 0 .. 15 0 0
Do. 6 in. to 10 in. ..	12 0 0 .. 13 0 0
	Per standard.
Best Pitch Pine Deals	36 0 0 .. 46 0 0
Under 2 in. thick	0 10 0 extra.

JOINERS' WOOD.

White Sea First Quality Red: 4 in. by 11 in.	43 0 0 .. 44 0 0
3 in. by 11 in., and 2 in. by 11 in.	42 0 0 .. 43 0 0
4 in. by 9 in.	38 0 0 .. 39 0 0
3 in. by 9 in., and 2½ in. by 9 in.	37 0 0 .. 38 0 0
9 in. by 11 in. boards	1 0 0 .. more than deals.
7 in. and 8 in. battens	34 0 0 .. 35 0 0
7 in. and 8 in. boards	1 0 0 .. more than battens.
Archangel White Deals—Best 3 in. by 9 in. and 10 in. and 11 in.	40 0 0 .. 44 0 0
Seconds, do.	2 0 0 less than best.
U.S. Battens	31 0 0 .. 33 0 0
Prepared Floorings and Matchings, Seconds Swedish Red and equal—	
1¼ in. by 6½ in. planed and shot	Per square actual. 2 3 0 .. 2 5 0
1¼ in. by 6½ in. planed and matched	2 4 0 .. 2 6 0
1 in. by 6½ in. planed and shot	1 12 0 .. 1 14 0
1 in. by 6½ in. planed and matched	1 13 0 .. 1 15 0
¾ in. by 6½ in. planed, matched, and beaded, or V jointed	1 6 0 .. 1 8 0
1 in. by 6½ in. do.	1 10 6 .. 1 12 0
Columbian or Oregon Pine, best quality	Per standard. 50 0 0 .. 55 0 0
Yellow Pine—First regular sizes	57 0 0 upwards.
Oddments	43 0 0 „
Seconds, regular sizes	44 0 0 „
Oddments	38 0 0 „
Kauri Pine—Planks per ft. cube	0 8 0 .. —
Wainscot Oak Logs, per ft. cube	0 10 6 .. 0 12 6
Dry Wainscot Oak, per ft. super, as inch	0 1 0 .. 0 1 3
¼ in. do. do.	0 0 10 .. 0 1 0
Dry Mahogany—Honduras, Tabasco, per ft. super, as inch	0 1 0 .. 0 1 4
Cuba, Mahogany	0 1 6 .. 0 2 6
Dry Walnut, American, per ft. super, as inch	0 1 0 .. 0 1 3
French, "Italian," Walnut	0 1 0 .. 0 1 6
Teak, per load (Rangoon or Moulmein)	26 0 0 .. 30 0 0
Do. do. (Java)	24 0 0 .. 26 0 0
American Whitewood planks, per ft. cube	0 8 6 .. 0 9 0
Glue, per cwt.	3 15 0 .. 3 19 0

METALS.

JOISTS, GIRDERS, &c.

Rolled Steel Joists, ordinary sections, basis price	*Prices controlled by the Ministry of Munitions.*
Plain Compound Girders, ordinary sections	
Plain Compound Stanchions	
Angles, Tees, and Channels, ordinary sections	
Flitch Plates	
Cast Iron Columns and Stanchions, plain ordinary patterns	

WROUGHT-IRON TUBES AND FITTINGS—
Discounts off Association Prices.

	Tubes. Per Cent.	Fittings. Per Cent.
Gas at works	47½	50
Water „	42½	47½
Steam „	37½	45
Galvanised gas at works	30	42½
„ water „	21½	40
„ steam „	15	37½

L.C.C. SOIL PIPE—	London Prices. Pipes Coated. s. d.	Bends. s. d.	Branches. s. d.
2 in.	2 7	1 10	2 2
2½ in.	3 0	2 0	2 9
3 in.	3 9½	2 2	3 4
3½ in.	4 2	2 9	3 10
4 in.	4 6½	3 1	4 5

RAIN-WATER PIPES, &c.	London Prices. Pipe. s. d.	Bends. s. d.	Branches. s. d.
2 in.	1 10½	1 0	1 4
2½ in.	2 1	1 2	1 8
3 in.	2 4½	1 5	2 2
3½ in.	2 11½	1 9	2 7
4 in.	3 2	2 1	3 1

METALS (*Continued*).

L.C.C. DRAIN PIPES—	London Prices. 4 in., 4s. 6d. .. 5 in., 5s. 6d. .. 6 in., 6s. 6d. Per ton, in London. £ s. d.	£ s. d.
IRON—		
Common Bars	16 10 0 to	17 0 0
Staffordshire Crown Bars—good merchant quality	16 10 0 ..	17 10 0
Staffordshire "Marked Bars"	17 10 0 ..	18 0 0
Mild Steel Bars	19 0 0 ..	19 10 0
Steel Bars. Ferro-Concrete quality, £19 basis price.		
Hoop Iron, basis price	20 0 0 ..	20 10 0
„ „ Galvanised	33 0 0 ..	—
(* And upwards, according to size and gauge.)		
Sheet Iron Black—		
Ordinary sizes to 20 g.	22 0 0 to	?2 10 0
„ „ 24 g.	23 0 0 ..	23 10 0
„ „ 26 g.	24 0 0 ..	24 10 0
Sheet Iron, Galvanised flat, ordinary quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	22 0 0 ..	—
Ordinary sizes to 22 g. and 24 g.	?2 0 0 ..	?2 10 0
Ordinary sizes to 26 g.	25 0 0 to	25 10 0
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	25 0 0 ..	—
„ 22 g. and 24 g.	25 10 0 ..	—
Ordinary sizes, 26 g.	26 10 0 ..	—
Galvanised Corrugated Sheets—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	31 0 0 ..	—
Ordinary sizes, 22 g. and 24 g.	31 10 0 ..	—
Ordinary sizes, 26 g.	32 0 0 ..	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	24 10 0 ..	—
Best Soft Steel Sheets, 20 g. and 24 g.	24 15 0 ..	—
Best Soft Steel Sheets, 26 g.	26 10 0 ..	—
Cut Nails, 3 in. to 6 in.	22 0 0 ..	23 12 6
(Under 3 in., usual trade extras.)		

LEAD, &c.

Delivered in London.

	£ s. d.
LEAD—Sheet, English, 4 lb. and up	41 15 0 .. —
Pipe in coils	42 5 0 .. —
Soil pipe	45 5 0 .. —
Compo pipe	45 5 0 .. —
NOTE—Country delivery, 20s. per ton extra; lots under 5 cwt., 1s. 6d. per cwt. extra.	
COPPER—	
Strong Sheet ..... per lb.	0 1 6 .. —
Thin „ ..... „	0 1 5 .. —
Copper nails ..... „	0 1 6 .. —
Copper wire ..... „	0 1 5 .. —
BRASS—	
Strong Sheet ..... „	0 1 6 .. —
Thin „ ..... „	0 1 5 .. —
TIN—English Ingots „	0 1 10 .. —
SOLDER—Plumbers' „	0 0 10 .. —
Tinmen's „	0 1 1 .. —
Blowpipe „	0 1 3 .. —

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

Per Ft.		Per Ft.
15 oz. fourths 4d.	26 oz. thirds	6½d.
„ thirds 4½d.	32 oz. fourths	6½d.
21 oz. fourths 5d.	„ thirds	8d.
„ thirds 5½d.	Fluted Sheet, 15 oz.	5½d.
26 oz. fourths 5½d.	„ 21 oz.	6½d.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per Ft.
⅛ Rolled plate	4d.
3/16 Rough rolled and rough cast plate	4½d.
¼ Rough rolled and rough cast plate	4½d.
Figured Rolled, Oxford Rolled, Baltic Oceanic, Arctic Muffled, and "Stippolyte," white	4½d.
Ditto, tinted	6½d.
Rolled Sheet	4½d.

PAINTS, &c.

	£ s. d.
Raw Linseed Oil in pipes ..... per gallon	0 4 3
„ „ „ in barrels ..... „	0 4 4
„ „ „ in drums ..... „	0 4 5
Boiled „ „ in barrels ..... „	0 4 6
„ „ „ in drums ..... „	0 4 10
Turpentine in barrels ..... „	0 4 6
„ in drums ..... „	0 4 8
Genuine Ground English White Lead, per ton (In not less than 5 cwt. casks).	54 0 0
Red Lead, Dry ..... per ton	56 0 0
Best Linseed Oil Putty ..... per cwt.	0 12 0
Stockholm Tar ..... per barrel	4 5 0
Filocol ..... per cwt.	0 9 6
GENUINE WHITE LEAD PAINT— "Blackfriars," "Nine Elms," "Park," and other best brands (in 14 lb. tins) not less than 5 cwt. lots .. per ton delivered	68 0 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 9 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 6
Fine Elastic Carriage	0 12 0
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 10 0
Finest Pale Durable Copal	0 18 6
Extra Pale French Oil	1 1 0
Eggshell Flating Varnish	0 16 0
White Pale Enamel	1 4 6
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 0
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 16 0

TRADE NEWS.

The Diamond Tread Co., Ltd., 28, Victoria-street, S.W., have issued a neat little illustrated brochure dealing with their specialities—Non-slipping Treads and Tiles. The Diamond Treads are composed of genuine carborundum grit and the makers' secret cement, and are made in any length and prepared ready for fixing on new or worn wood, stone or granolithic steps. Their carborundum tiling is constructed of a secret cement and sparkling carborundum grits combined with pressure, and it is claimed that these tiles are practically indestructible, as well as being impervious to heat, cold or dampness. These productions are supplied under exclusive contract to H.M. War Office and Admiralty.

The cellar of "The Hope and Anchor" Inn, at Hanworth, Middlesex, was formerly flooded every year to a considerable depth. In the summer of 1913 it was decided to prevent this continual nuisance and a treatment of Pudloed cement was given to the floor and walls. We learn that the cellar has been perfectly dry since, and is now used for storage in both winter and summer.

The buildings at a flying ground for H.M. Government are being ventilated by means of Shorland's Exhaust Roof Ventilators, supplied by Messrs. E. H. Shorland & Brother, Ltd., of Failsworth, Manchester.

Bell's United Asbestos Co., Ltd., have recently laid "Decolite" fire-resisting floors at the Palladium Theatre, Oxford Circus. The architect is Mr. Bertie Crewe, 75, Shaftesbury-avenue.

Boyle's latest patent "Air-pump" ventilators, supplied by Messrs. Robert Boyle & Son, ventilating engineers, 64, Holborn-viaduct, London, E.C., have been adopted for the Power House, Londonderry Collieries, Ltd., Seaham Colliery, Seaham Harbour.

The Grampian Engineering Co., Ltd., of Causewayhead, Stirling, N.B., and 43, Aldwych, London, have introduced a new method of steam disinfection, entitled the "Velox Combined Pressure Steam and Vacuum Formalin Apparatus," which meets the difficulties and dangers of the high-pressure steam process, which often damages very fine fabrics as well as coloured stuffs and other very sensitive materials; while articles of leather, rubber goods, furs, and books are frequently disinfected in an imperfect manner, as they are too susceptible to the influence of heat, while, in addition, stains are frequently indelibly fixed by the steam process. By the introduction of formalin, effective penetration is ensured with a temperature of 162 degs. to 176 degs. (Fahrenheit), which would be useless without its use. The firm manufacture disinfectors to suit all types of work, which can be inspected and explained at their show rooms, which should be visited.

The Y.M.C.A. Hut, Piccadilly, Manchester, is being supplied with Shorland's warm air ventilating patent Manchester grates by Messrs. E. H. Shorland & Brother, Ltd., of Failsworth, Manchester.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 2 p.m. on Wednesday.*

* Denotes *accepted.* † Denotes *provisionally accepted.*

GLASGOW.—For wiring a portion of the harbour tunnel, for the T.C. :—
*W. Anderson, Ltd., Glasgow .. £132 2 9

HULL.—The Works Committee of the Corporation have accepted the following tenders :—Iron and steel : Messrs. Gardiner, Barugh & Jones (three months). Lime : Messrs. Henry Mead & Co. (twelve months). Salt glazed pipes, &c. : Messrs. Dawber, Townsley & Co., Ltd., for "Nalethric" pipes (twelve months). Iron castings : Messrs. Moss & Co. (twelve months). Portland cement : Messrs. G. & T. Earle (1912), Ltd. (twelve months). Tar, pitch, &c. : Messrs. E. Hardman, Sons & Co. (twelve months).

LEEDS.—The T.C. has extended the contract of Joseph Henry, Ltd., for sewer iron work for a period of six months after the war at the present contract price, plus an increase agreed upon.

LONDON.—Supply of (*a*) settling tank and (*b*) complete set of air lift pipes in connection with the newly-well sunk at the rear of the bath premises of the Hackney Borough Council :—
*C. Isler & Co., Ltd., Southwark..(*a*) £125; (*b*) £180.

LONDON.—For supplying and fixing a domestic boiler in library basement, for the Holborn B.C. :—
‡ Hardware Trading Co.
‡ Recommended for acceptance.

NEWBURY.—For the erection of new wash-house drying and ironing room at the Isolation Hospital for the Corporation :—
*A. J. Chivers £50 0 0

NEWPORT (Isle of Wight).—Supply to the Corporation of 400 tons of granite, to pass through a 1¼ in. gauge, and 100 tons of ¾ in. granite chippings, delivered upon the Town Quay.

	Granite (per ton)	Chippings (per ton)
Messrs. Rowe & Mitchell .. inclusive of freight and delivery rate of 9s. per ton.	£0 18 9	£0 18 9
Messrs. Brooke's, Ltd., Westminster .. .. .. inclusive of freight and delivery rate of 10s. per ton.	1 0 4	1 0 4

PORTSMOUTH.—Supply of spare fittings, &c., for the Drainage Committee of the Corporation :—

H. & W. Davis, Ltd.	£87 0 0
Vosper & Co., Ltd.	81 0 0
Wilkes & Co.	76 15 0
McKinlay & Co., Ltd.	76 0 0
*J. Shervell, Ltd.	72 10 0

ROMFORD.—For supply to the R.D.C. of granite, as follows :—603 tons broken to 2 in. cube, 450 tons broken to 1½ in. cube, and 73 tons broken to ¾ in. cube :—
*W. Griffiths & Co., Ltd., Hamilton House, E.C. £996 12 8

SHEFFIELD.—For painting works for the Corporation :—

				Baths.
*F. A. Tinker & Sons	£180	0	0	Corporation-street.
*Simpson & Melling	275	0	0	Brightside.
*Simpson & Melling	122	0	0	Glossop-road.
*E. Hudson	28	10	0	Upperthorpe.
*E. Hudson	38	0	0	Park.

SHEFFIELD.—Extension of No. 1 ashes ropeway at Neepsend Power House for the Corporation :—
*R. White & Sons £1,096 0 0

SOUTH SHIELDS.—For heating and ventilation of Court Buildings and Fire Brigade Station for the Corporation :—

*G. Grey, South Shields (Boiler and flue)	£69 13 0
*Emley & Sons (Heating Fire Station	42 0 0

NEW COMPANY.

THE undermentioned particulars of a new company recently registered are taken from the Daily Register compiled by Messrs. Jordan & Sons, Ltd., Company Registration Agents, Chancery-lane, E.C. :—

E. B. HOLMES & Co., LTD. (145,572). Registered December 19th, to carry on the business of a builder and contractor in all branches. Nominal capital £10,000 in £1 shares.

Seasoned
AUSTRIAN, RUSSIAN and JAPANESE **Oak**
SYDNEY PRIDAY,
KING WILLIAM HOUSE, 2a, Eastcheap, LONDON, E.C.
Depot: Wainscot Sheds, Millwall, E. *T.N.: Avenue 667.*

J. J. ETRIDGE, Jr.
SLATE MERCHANTS, LTD.
EXPERTS IN
SLATING, TILING.
AIR RAID REPAIRS.
Telephone: Avenue 4940 (two lines), or write
Bethnal Green Slate Works,
BETHNAL GREEN, LONDON, E.

Asphalte.—The Seyssel and Metallic Lava Asphalte Co. (Mr. H. Glenn), Office, 42, Poultry E.C.—The best and cheapest materials for damp-courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to Forth Bridge Co. T.N. Central 2844.

Telephone: DALSTON 1388
OGILVIE & CO., Many years connected with the late firm of W. H. LASCELLES & Co., of Bunhill Row.
Mildmay Works, Mildmay Avenue, Islington, N.
EXPERTS IN HIGH-CLASS JOINERY.
ALTERATIONS AND DECORATIONS. ESTIMATES FREE.

Illustrated Catalogue Post Free on application.

HOT WATER INSTANTLY
NIGHT OR DAY
"EWART'S" GEYSERS
20 Gold Medals and Awards. Established 1834.
Hot Bath in 5 Minutes.
HOT, WARM, OR TEPID SHAMPOO.
EWART & SON Ltd., 346-350, EUSTON ROAD,
Telephone: Museum 2570 (4 lines). Telegrams: "Geyser, London." LONDON, N.W.